DOCUMENT RESUME

ED 044 047 48 EM 008 541

AUTHOR	Dimling, John A., Jr.; And Others
TITLE	Identification and Analysis of the Alternatives for Achieving Greater Television Program Diversity in the United States.
INSTITUTION	President's Task Force on Communications Policy, Washington, D.C.; Spindletop Research Center, Lexington, Ky.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Bureau of Research.
REPORT NO	RR-226
BUREAU NO	BR-8-0479
PUB DATE	26 Jul 68
GRANT	OEG-3-8-080479-0036
NOTE	186p.
EDRS PRICE	EDRS Price MF-$0.75 HC-$9.40
DESCRIPTORS	Broadcast Industry, Broadcast Television, Cable Television, Commercial Television, Community Antennas, Costs, Educational Television, Estimated Costs, Industry, *Multichannel Programing, Program Costs, Programing, Public Television, Television Surveys, *Television Viewing, Video Tape Recordings, Viewing Time

ABSTRACT

Several alternatives to the present television industry structure are considered in this study. They are: continuation of present policies, satellite-to-home broadcasting, and cable distribution of television. Trends noted are: the growth of commercial UHF (Ultra High Frequency) stations, the introduction of all-channel sets, population growth, increase in network revenue and expenses, and unchanging amount of local programing, the growth of Community Antenna Television (CATV), program origination by local CATV systems, and the concentration of control within the television industry. The prospects for wider diversity in television programs are mixed. At present, educational television contributes to this diversity. Pay television may also contribute, but is apt to encounter regulatory and economic problems. In the future, video tapes and video records will reach selective audiences in the way that books do. Satellite-to-home broadcasting offers a glamorous alternative for distributing television, but does not seem to offer program diversity. Cable television, or the wired city, may increase program diversity, depending upon its sources of support and the types of organizations that will make programs available. (MF)

ED0 44047

Identification and Analysis of the Alternatives for Achieving Greater Television Program Diversity in the United States

SPINDLETOP RESEARCH

EM008 541

ED0 44047

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

REPORT 226

IDENTIFICATION AND ANALYSIS OF THE ALTERNATIVES FOR ACHIEVING GREATER TELEVISION PROGRAM DIVERSITY IN THE UNITED STATES

by

John A. Dimling, Jr.
Ronald W. McCabe
Wayne E. Schmiedeknecht

Prepared for:

President's Task Force on Communications Policy
Washington, D.C.

John A. Dimling Jr.

John A. Dimling, Jr., Manager
Communications and Systems

26 July 1968

The Research Program reported herein was performed pursuant to a contract with the United States Department of Health, Education and Welfare, Office of Education.

SPINDLETOP RESEARCH
IRON WORKS ROAD • LEXINGTON, KENTUCKY 40505

SPINDLETOP
RESEARCH

CONTENTS

Section	Title	Page
I	INTRODUCTION	I-1
II	SUMMARY	II-1
III	THE PROBLEM OF DIVERSITY	III-1
	Diversity in Television	III-1
	Analysis of the Problem	III-4
	Industry Structure	III-4
	Implications for Programming Decision - Theoretical	III-6
	Industry Performance	III-8
IV	DISCUSSION AND ANALYSIS OF ALTERNATIVES	IV-1
	Trends in Television	IV-1
	Commercial Television	IV-2
	Growth of Commercial UHF Stations	IV-2
	Possibilities for Fourth Network	IV-7
	Local Programming by Commercial Stations	IV-18
	Other Changes Expected	IV-24
	Community Antenna Television (CATV)	IV-25
	Growth of CATV	IV-25
	Trends in Program Origination	IV-27
	Trends in Organization	IV-31
	Educational Television	IV-32
	Pay Television	IV-39
	Other Audio-visual Systems	IV-40
	Video Record Concept	IV-40
	Costs	IV-41
	Potential for Achieving Diversity	IV-41
	Summary	IV-42
	Satellite-to-Home Broadcasting	IV-43
	System Concept	IV-43
	System Costs	IV-44
	Feasibility for Commercial Broadcasting	IV-46
	Feasibility for Public Television	IV-48
	Conclusions	IV-48

- Cable Distribution IV-49
  - Description of Alternative Systems IV-49
  - Evaluation of Wired City IV-52
    - Programming-Availability IV-52
    - Programming-Financial Support IV-55
      - Advertiser Support IV-55
      - Viewer Support IV-60
      - Support from Special Groups IV-61
      - Governmental Support IV-62
    - Impact of the Wired City IV-62
      - Local Television Stations IV-62
      - Commercial Network IV-68
      - Program Costs and Advertising Revenue IV-69
      - Other Considerations IV-71
    - Summary IV-71

APPENDIX A - Uses of the Television Medium
APPENDIX B - The Audience for Diversified Television
APPENDIX C - NAB Survey
APPENDIX D - Wired Distribution Systems
APPENDIX E - Consumer Time and Money Budgets
APPENDIX F - Program Cost Information
APPENDIX G - TV Channel Allocation and Usage
APPENDIX H - Television Viewing of Repeated Programs

ILLUSTRATIONS

Figure	Title	Page
IV-1	Total National Advertising Expenditures	IV-11
IV-2	Network Television Share of National Advertising	IV-11
IV-3	Projected Program and General Expense for New Network	IV-14
IV-4	Break-even Curve for Over-the-Air Broadcasting	IV-53
D-1	Comparison of Layouts for Wired City and Over the Air--CATV Systems	D-4
D-2	Service Arrangement for Short Hop Microwave Distribution System	D-8
D-3	Service Arrangement for Millimeter Wave Umbrella System	D-13
D-4	Wiring Detail for Connecting Special Television Receiver to British Rediffusion System	D-16
D-5	General Layout Switched Two-way Coaxial Cable System	D-18
D-6	General Layout Switched One-way Video Cable System	D-22
E-1	Percent of Recreation Spending on Specific Classes of Goods and Services	E-9

TABLES

Number	Title	Page
III-1	Broadcast Expenses--1966	III-5
III-2	Commercial Programming in Regular Prime Time	III-10
IV-1	Selected Financial Data for Commercial UHF Stations	IV-4
IV-2	Numbers of Commercial Television Stations	IV-5
IV-3	Status of Television Channel Assignments	IV-6
IV-4	Stations Affiliating with a Fourth Network	IV-8
IV-5	Status of Channel Applications	IV-9
IV-6	Network TV Advertising	IV-12
IV-7	Network Advertising	IV-13
IV-8	Broadcasting Schedule--Fourth Network	IV-13
IV-9	Network Expenses	IV-15
IV-10	Financial Projections for a Fourth National Television Network	IV-16
IV-11	Local Programming	IV-19
IV-12	Average Hours of Local Programming Per Week--1967 By Size of Station	IV-20
IV-13	Total Quarter-Hour Audiences for Local Programs	IV-21
IV-14	Local Programming	IV-23
IV-15	Growth of CATV	IV-26
IV-16	Summary of Cablecasting Questionnaire	IV-30

Number	Title	Page
IV-17	Satellite-to-Home Broadcasting Systems (single channel)	IV-45
IV-18	Advertising Expenditures	IV-58
IV-19	Television Advertising Costs	IV-57
IV-20	Broadcasting Revenues and Profits	IV-64
B-1	Programs Available Versus Programs Watched	B-3
B-2	Viewer Choices	B-4
B-3	Educational Television Ratings by Program Type, January 1968	B-5
B-4	Educational TV Viewing, 1962	B-7
B-5	Projected Reach of Diversified Television	B-8
B-6	Estimated Frequency of Viewing Diversified Television	B-10
B-7	Summary of University of Michigan Time Use Survey, Free Time Activities	B-12
B-8	Television Viewing	B-14
B-9	Programming Summary	B-15
B-10	Educational Attainment of ETV Viewers and Nonviewers in 1962, Percent Having Some College Training	B-16
B-11	Cultural Interest Index for ETV Viewers and Nonviewers	B-17
B-12	Audience Characteristics in AMI Study, Weight of Viewing by Percent of Education Group	B-18
C-1	Characteristics of Stations in Sample	C-8

Number	Title	Page
C-2	Total Number of Local Programs Per Average Week	C-9
C-3	Total Station Revenues and Expenses in 1967	C-10
C-4	Station Gross Profits in 1967	C-10
C-5	Total Revenue from Local Advertisers in 1967	C-11
C-6	Number of Local Advertisers in 1967	C-11
C-7	Products and Services Advertised by Station's Five Largest Advertisers in 1967	C-12
C-8	Total Hours of Local Programming in 1967	C-13
C-9	Total Quarter-Hour Audiences (in Households) for Local Programming Per Average Week	C-14
D-1	Added Costs to Public for Wired Service	D-5
D-2	CATV System Costs	D-6
D-3	Principal Difference of Quasi Laser and AML Systems	D-11
D-4	Savings On Standard TV Receivers	D-18
D-5	Subscriber Charges	D-21
E-1	Comparison of Budget Average for Various Groups in Lundberg et al (1934) With Similar Groups of the 1965-1966 Study	E-4
E-2	Comparison of 1954 J. A. Ward-Mutual Broadcasting Company Estimates With Those of the 1965-1966 Study	E-5
E-3	Comparison of 1935 Sorokin and Berger Results with Those of the 1965-1966 Study	E-6

Number	Title	Page
E-4	Summary of University of Michigan Time Use Survey, Free Time Activities	E-7
E-5	Recreation Spending	E-8
F-1	Program Costs--Examples	F-2
F-2	Representative Costs for Contract Programming	F-3
F-3	Comparative Cost Analysis for Television Facilities Using Two Live Cameras, Two Film Chains and Two Video Tape Machines	F-4
G-1	TV Channel Allocation and Usage	G-2
H-1	Fraction of Total Potential Audience Watching Repeated Programs	H-3

I. INTRODUCTION

This report describes a study performed by Spindletop Research for the staff of the President's Task Force on Communications Policy under contract OEG-3-8-080479-0036 with the Office of Education. The study was performed from 1 April 1968 to 1 July 1968 under the general direction of John A. Dimling, Jr., Manager, Communications and Systems Division. Approximately 10 man-months of professional effort were devoted to the study. Project personnel included Mr. Dimling, Ronald W. McCabe, Dr. Lawrence K. Lynch, and Wayne E. Schmiedeknecht. Richard Heffner Associates served as consultants.

SCOPE OF THE STUDY

In making this study Spindletop Research was to investigate possible ways to increase diversity in television programs. The basic approach taken was to examine possible changes in television--both technical and institutional--that could result in greater diversity. For each alternative, information is provided so that each change can be evaluated in terms of its cost, its effectiveness in providing program diversity, and its impact on the existing television industry.

The many distribution and organizational alternatives have been reduced to these:

- Current trends in the industry--including the growth of CATV, UHF stations, a fourth commercial network, etc., under the assumption of no drastic policy changes
- Satellite-to-home broadcasting of either commercial or educational programs
- Cable distribution of television to homes from local stations or distribution centers--the wired city

Time and budget limitations made an exhaustive examination of these alternatives impossible. For example, the National Association of Broadcasters (NAB) has (quite properly, in our view) devoted approximately the same resources as were allocated for this entire study to examining certain aspects of the wired city. The results of this study, therefore, are intended only to illuminate the major issues and to suggest answers.

ACKNOWLEDGEMENTS

In carrying out this study, Spindletop was fortunate to receive the cooperation and assistance of a great many people. Dwight W. Martin, Vice President and Treasurer of WDSU-TV, and W. Theodore Pierson and Vernon C. Kohlhass of Pierson, Ball & Dowd, contributed valuable time to reviewing the study and to making helpful comments and suggestions. Several people from the National Association of Broadcasters contributed time and energy to conducting the survey of stations discussed in this report. Howard Mandel and Philip A. Harding performed the laborious task of collecting and tabulating the survey data; William Walker tested the survey questionnaire, and William Carlisle provided general guidance and support.

Wally Briscoe of the National Community Television Association (NCTA) provided helpful information by surveying NCTA members on program origination. Chalmers Marquis, Holt Riddleberger, and James Fellows of the National Association of Educational Broadcasters (NAEB) were helpful in providing data on ETV operations, and made useful suggestions about the concept of program diversity. Henry Alter, of National Educational Television (NET) provided information about NET programs. Dr. David Blank, CBS, furnished some interesting ideas about the demand for program diversity; James Clokey, NBC, provided information about network program sources. Bert Briller, of the Television Information Office (TIO) furnished studies by TIO of local programming. Beardsley Graham provided information about video records and made other useful suggestions. Professors H. J. Barnett and E. Greenberg of Washington University made helpful comments on the study.

The help of these people is greatly appreciated. None of them, of course, bears the responsibility for the final results of the study; the views expressed are those of the Spindletop project team.

II. SUMMARY

PURPOSE OF THE STUDY

The purpose of this study is to evaluate ways in which diversity in television programming might be increased. Whether such diversity is a worthwhile goal is not considered here; the goal of diversity is accepted as given for this investigation.

Developing an operational definition of program diversity is difficult. Diversity may refer to the content of television programs, to the suppliers of programs, or to the audiences for programs. Ideally, diversity could exist in each of these dimensions--a model of diversity in television would consist of a large number of program suppliers providing programs of widely varying content to various groups of television viewers.

Such a situation does not exist today. Certain characteristics of the television industry--a limited number of stations, high program costs, and advertiser sponsorship of programs--lead to a concentration of program types that attract mass audiences. Because commercial broadcasters seek profits, and because television advertising revenues are proportional to program audiences, program decisions generally seek to provide programs that will attract the largest possible audiences. Broadcasters achieve large audiences by providing the most popular types of programs, and dividing the audiences for these programs. As each new broadcaster enters a market, he must decide whether to offer programs similar to those already available, and thus share the mass audience for these programs with other broadcasters in the market, or to offer different types of programs of interest to selective audiences. Because the number of broadcasters in any one market is small--generally four or less--dividing the audiences for the programs acceptable to the largest number of viewers allows each broadcaster to capture larger audiences than he would by attracting the total audience for less popular programs. The intensity of viewers' desires to watch programs is not important to the broadcaster--his revenue depends primarily on the number of people viewing his programs. In providing programs that are acceptable to as many viewers as possible, it is therefore remotely possible that no viewer will be offered his favorite type of program.

In present-day commercial television, then, the structure and economics of the industry and the program decision mechanism make television a mass media, unresponsive to selective audiences. Several alternatives to the present industry structure were considered in this study, and each alternative was evaluated in terms of the diversity that it might provide. The results can be summarized as follows:

ALTERNATIVES FOR ACHIEVING DIVERSITY

Alternative 1: Continuation of Present Policies

Assuming continuation of present regulatory policies, the prospects for achieving wider diversity of programs are mixed. In commercial television there will be an increase in the number of UHF stations; in the next decade, more than 100 new stations are likely to go on the air. Prospects for a full-scale fourth network are poor. Most important, however, is the fact that new stations and a new network are likely to provide programming similar to that already available; their goal will be large audiences, and they can achieve the largest audiences in this way. Pay TV is unlikely to become a force in the industry without significant changes in regulatory policy.

Locally oriented programming is likely to increase. Although there is no apparent trend toward more local programming by existing television stations, new program sources may develop. The first of these is community antenna television (CATV). Although the Federal Communications Commission (FCC) ban on commercial origination will be a deterant, program origination by CATV may expand, either as a condition imposed on the CATV operators in their franchise grants, or as an inducement to viewers to subscribe to the service.

A second source of local programming could be low-powered community stations. One such station is now operating successfully, showing high school sports events and discussions of local issues. Operating on a small scale so that costs are minimal, the station serves the local community in a way that larger stations in the nearby cities cannot afford to do.

The development of community stations in areas served by big-city stations could be encouraged by positive FCC action. Expanding the limit on multiple station ownership could attract considerable resources to these operations and would allow certain economies of scale. Commission regulations concerning transmitter power and service area overlap might also have to be modified to permit development of community stations.

The continued growth of ETV stations over the next decade will help raise the fraction of the population that can receive at least one ETV signal from 75 percent to over 90 percent, so most viewers will have an alternative to the light entertainment programs of commercial television. Increased government support of ETV is likely, but such support does not guarantee that program decisions will respond to minority tastes. Although tax supported programming may seek to provide "something for everyone," the fact that voters must ultimately have control over such programming could lead to program decisions aimed at attracting large audiences.

A video record industry is also likely to develop in the next decade. This development should provide a means for a variety of program suppliers to furnish programs to various selective audiences, thus providing diversity. The costs of video records and playback equipment, however, may limit penetration to families with above-average incomes.

Alternative 2: Satellite-to-Home Broadcasting

The use of direct satellite-to-home broadcasting has been suggested as a means for achieving program diversity by reducing program distribution costs. The conclusion of this study is that satellite-to-home broadcasting would not bring about greater program diversity. When the distribution costs borne by the home viewer (antenna, etc.) are added to the satellite costs, program distribution costs are prohibitively large, with the costs for a single channel system approximating the costs for a multichannel cable system in urban and suburban areas. The high costs of satellite-to-home broadcasting would limit penetration so that use of the system by a commercial network would be unlikely. Furthermore, such a network would seek large audiences by competing for viewers by offering programs similar to those now available. Direct satellite-to-home broadcasting would allow little diversity based on geography, and to the extent that it replaced local stations as distributors of network programs, it would eliminate these stations.

Alternative 3: Cable Distribution of Television

Cable distribution of television--the wired city--has been proposed as a means of achieving program diversity by increasing the availability of channels. Many alternatives--both technical and institutional--exist for bringing about the wired city. Some of the technical alternatives are described in Appendix D of this report. One institutional alternative was investigated--the growth of CATV in an actively favorable regulatory environment, and the transition from CATV (where television signals would be available over the air to nonsubscribers) to the wired city (in which signals are distributed only by cable). Recent regulatory developments--the affirmation of FCC jurisdiction over CATV, and the partial resolution of the question of CATV copyright liability--may allow the logical evolution from CATV to the wired city. (Evolution from CATV is not proposed as the only or best way to create the wired city; this alternative was explored as a result of a division of labor agreement with the Task Force staff.)

Two major issues concerning the wired city were investigated in this study: first, the prospects for achieving greater program diversity in the wired city and second, the impact of the wired city on existing organizations. The conclusion of this study is that adequate programming resources exist to make use of a large number of (i.e. 15 to 20) television channels, and that economic support would exist for most types of programs. Pay television would be feasible in the wired city, and might be structured so that it would respond to the program desires of selective audiences. Advertising could support a national network providing heavy entertainment and educational programs similar to those of present ETV, although such support would require a mechanism for assuring that the network did not seek to maximize the audiences. Because the wired city would allow access to viewers on a community-by-community basis, small stations providing low-budget community-oriented programming would probably develop.

Implications of the wired city for the existing television industry are quite substantial. A central issue involves the relations between networks and their affiliated stations and the networks' access to the wired city. This is partly an issue of how much, and in what manner, to assess the networks for using the cable to distribute their programs to viewers. If networks (or their affiliates) pay the same time charges as all other users, then local stations in their present form would cease to be viable in all but the largest markets, and the local programming they provide would be lost. (In the one institutional alternative described in the study--the evolution of CATV into the wired city--networks would not necessarily have direct access to the cable.)

Even if existing stations maintain their network affiliations and continue to collect revenue from advertising on and around network programs, increased competition for viewers from additional networks and small community stations will reduce station revenues. This will force them to reduce or eliminate much of their local programming. Similarly, if ETV stations are eliminated in the distribution of national programs (e.g., NET programs), these stations could probably not exist, and the local programming they provide would be lost.

If networks have direct access to viewers through the cable, additional networks are likely to develop. Increased network competition is not likely to cause significant changes in advertising rates or in total network advertising revenues. Because revenues of each individual network would be reduced, pressure would exist to cut program costs, and the resources allocated to news and documentary programming would be reduced. It is not likely that cost pressures would reduce program quality significantly, although some less expensive production equipment might be used.

III. THE PROBLEM OF DIVERSITY

DIVERSITY IN TELEVISION

The purpose of this study is to examine ways in which greater diversity in television programs might be achieved. To understand the nature of the problem--the presumed present lack of diversity in television--it is useful first to define diversity more explicitly.

There are many dimensions of the television industry to which the concept of diversity might be applied, because television has many uses. For viewers, it is a source of entertainment and information; for advertisers, a medium for delivering a message; for artists, a means for reaching wider audiences; for broadcast owners, a source of income as well as a vehicle for widening the owner's sphere of influence. Diversity has meaning when applied to each of these groups: for instance, diversity in advertising support, e.g., better access to TV by small advertisers, could be sought. More ready access of artists to the medium might be considered desirable. Diversity in station ownership has been a stated goal of public policy. The primary focus of this study, however, is on diversity as it affects the viewer. The program diversity sought refers to those programs for which audiences exist, but are too small in size to be economically viable in present-day television--those programs which attract national audiences of less than seven million homes in prime time.

Most discussions of program diversity have focused on program content, and this may be the most important factor to consider. There are, however, at least two other areas in which diversity can have significant meaning; it may refer to diversification in the suppliers of programs, or it may refer to diversity in the audiences viewing the programs. Increased diversity, when applied to the sources of program supply, probably refers mainly to a larger number of program suppliers; as the number increases, such power as these suppliers have over the content of programs tends to be diffused; as the number increases, so likely does the innovative activity. In addition, certain purposes that can be served by television, which are discussed below, are better served as the number of program suppliers increases.

Diversity in program sources can also be considered in terms of point of program origination. At least three points of program origination can be distinguished, only two of which now exist. These are:

- Origination at any point in the country for national distribution
- Origination in a city to audiences in the city and surrounding region
- Origination at the local community level for audiences in the community

Greater diversity in the audiences for television programs involves attracting individuals to view television who have not been viewers. Seeking audience diversity is an easily defended goal, since such diversity would increase the number of people who benefit from television. Virtue can be claimed for alternatives that produce greater audience diversity without making value judgments about the quality of programs, and without taking the position that people's tastes must be upgraded.

The usual demand for diversity refers to diversity in the content of programs. One way to describe diversity in program content is by type of program. The diversity in content of present commercial programs, and even most ETV programs, is rather limited. Most are either entertainment, sports, or news and current events analyses. The most productive way then to develop such a taxonomy of programs may be to ask the broader questions: How can television help meet society's needs? What roles can television play in the future?

To answer these questions requires, of course, an examination of what society's needs will be in the future. This could be carried on at almost any depth. A cursory study suggests, however, the following broad categories of needs that might be served by the television medium. It should be noted that no a priori claim is made that television is the only, or even the best, medium for satisfying these needs; the following categories simply describe likely uses of television. These types of programs are discussed further in Appendix A.

- Entertainment
    - Light entertainment--including most present-day commercial fare

    - Heavy entertainment--classical music, "serious" drama, ballet
    - Sports
- Educational
    - Vocational (for adults)
    - "Better living"--"how-to," consumer education, health and welfare programs
    - "Better understanding"--documentaries, background information, adult education
- Information
    - Real-time coverage of current events
    - News
    - Job information
- Societal aids
    - Political programs
    - Discussions of local issues
    - Social control programs
- Locally produced nonprofessional programs

The above categories actually are based both on content and program source. In fact, locally produced nonprofessional programs could have any of the content suggested in the first four categories. For each type of program listed above, various audiences exist. In the area of educational programs aimed at providing better understanding, some programs could be aimed at children and others, at adults.

One final observation should be made about program diversity. If we are to consider the audiences for programs to be important in evaluating diversity, then the program schedules must also be considered. Scheduling of certain types of programs at odd hours, e.g., Sunday morning, while making them available in theory, cannot realistically be said to provide these programs to the majority of the population. Diversity therefore has a time dimension; even without increasing the number or type of programs on television, program diversity could be enhanced by increasing the number of different types of programs available at a given time.

For the purposes of this study, then, diversity in television programs consists of the following elements--a large number of program suppliers providing, at any given time, programs of widely varying content to various sized groups of television viewers.

ANALYSIS OF THE PROBLEM

Industry Structure

In order to understand the causes for the lack of diversity in television programming, it is necessary to consider certain aspects of the structure of the commercial television industry. The following discussion points out some of the industry's salient features, and provides a background for the analysis described later in this report.

The dimensions of the television industry important to this study relate to its various organizational groups and the interactions between them. Three major groups can be identified: broadcasters, which includes both the networks and local stations; advertisers; and viewers. These groups operate in an environment that is significantly influenced by the Federal Communications Commission and the Congress.

The three national television networks perform three important functions: First, each network owns and operates five television stations in five major cities. Second, they select and provide programs to local stations, each network transmitting the programs to its affiliated stations simultaneously from a central point. Third, each network sells broadcast time on its own stations and its affiliated stations to national advertisers, allowing the advertiser to broadcast his commercial message simultaneously throughout the country. The programming function is by far the most costly (see Table III-1), representing over 80 percent of network expense and over 60 percent of total broadcast expense.

Table III-1

Broadcast Expenses--1966
(Thousands of Dollars)

Type of Expense	Networks	TV Stations	Total
Technical	$ 40,944	$131,070	$ 172,014
Program	693,033	380,112	1,073,145
Selling	27,557	112,271	139,828
General and Administrative	63,618	261,517	325,135
Total	$825,152	$884,970	$1,710,122

Source: TV Broadcast Financial Data--1966. Federal Communications Commission

The 640 commercial television stations now broadcasting perform several important functions: First, they are a vital link in the television distribution system, either broadcasting network programs or programs received from other sources (syndicated programs) to home television receivers. In performing this function, they make the ultimate decision about what programs will reach the home viewer. Second, they are a source of programming themselves. Although stations vary considerably in the extent to which they produce programs, nearly all stations provide some local programming. (The extent to which this is done is discussed in Section IV.) Finally, stations also sell broadcast time, either directly to local advertisers, or through station representatives to advertisers with national or regional operations.

Most television advertisers are represented by advertising agencies. Since the agencies in many cases are responsible for planning their client's total advertising effort, the agencies not only choose among alternative television networks or stations but are also involved in allocating the client's total advertising budget among various media. Particularly in the large agencies, serious efforts are made to allocate advertising expenditures in an optimal manner, and the costs of various media are considered in relation to the effectiveness of advertising in the media.

Television viewers include nearly the entire population of the country. Ninety-five percent of the nation's households possess television receivers, and in the average household, the television set is turned on over six hours every day.*

The relationships between these three groups--the broadcasters, the advertisers, and the viewers--play a critical part in determining the programs available to the viewer. From the economist's standpoint, these groups meet in two separate markets. In one market, broadcasters compete with each other for the viewer's time, offering the viewer programs in return for his time. In the second market, the broadcasters sell the viewer's time (which they have procured in the first market) to advertisers, for which advertisers pay money to the broadcasters.† The money received from the advertisers pays for the programs with which the broadcasters barter for the viewer's time in the first market. Several points are important in the operations of these two markets. First, the viewer's time, which is traded in both markets, does not reflect the intensity of the viewer's feelings about the programs. The individual viewer can express his utility in only one way--by his decision to watch or not to watch.‡ The payment to broadcasters by advertisers is generally in direct proportion to the number of viewers delivered. Second, the volume of viewer time, which is the product delivered to the advertiser by the broadcaster, has zero marginal cost to the broadcaster. Having borne the initial expense of program production (which is usually considerable) distribution, and promotion, each additional viewer who watches the program costs the broadcaster nothing; the economies of scale for the broadcaster are therefore quite great.

Implications for Programming Decisions--Theoretical

The product the broadcaster sells to the advertiser is volume of viewer time. The broadcaster acquires viewer time by offering programs to the potential viewing audience; since the marginal cost to the broadcaster of viewing time is zero, and since the marginal revenue is positive, the broadcaster aims, in making his programming decisions, to attract the largest possible audience for his programs. To understand the implications of this for television, it is useful first to consider a theoretical analysis.*

---

*A. C. Nielson Company survey reported in Broadcasting. June 10, 1968. p. 9.

†This market actually consists of three markets--a national network market, a national market in which viewer time is sold by station representatives, and a local market.

‡Viewers might express their feelings about a program by their decisions to buy or not to buy the program sponsor's product; in practice, this happens in a very minimal way.

The earlier discussion of program diversity suggested broad categories of programs. Within each category of program, various types of programs could be described. In entertainment, for instance, commercial television programs could be broken down into comedy, westerns, adventure, game shows, variety, etc. The broadcaster, in making his programming decisions, may be considered to be selecting from among these various types of programs.

Associated with each type of program is an audience of a certain expected size. If the broadcaster has no competition for the audience, he could be expected to select the program type with the largest audience. If he must compete with one other broadcaster (who may be assumed to be broadcasting the type of program that draws the greatest audience), then he will compare the audiences he can expect with either the most popular program type or the next most popular type. If he provides the most popular type, then he may assume that he will split the audience for this type of program with the other broadcaster. If he selects the next most popular type, then his audience will consist of all the viewers who will watch the second type of program in preference to the first. The important point is that there is no _a priori_ reason for the broadcaster to provide a different type of program than is already available to viewers, given his goal of achieving the largest possible audience. Depending on the relative sizes of audiences for different types of programs, the broadcaster may

---

*This analysis follows Steiner, Barnett, and Wiles. See Steiner, P.O. "Program Patterns and Preferences and the Workability of Competition in Radio Broadcasting." _Quarterly Journal of Economics_. Vol. LXVI, No. 2. May 1952. pp. 194-223.
Barnett, H. J. "Economic Report of Dr. Harold Barnett," Exhibit D of _Comments of Midwest Television, Inc., in opposition to deletion of Channel 3 from Champaign, Illinois_. Before the Federal Communications Commission in the Matter of Deintermixture of Champaign, Illinois. Docket No. 14244. February 19, 1962.(Mimeo).
Wiles, P. "Pilkington and the Theory of Value," _Economic Journal_. Vol. LXXIII, No. 290. June 1963. pp. 183-200.

best realize his goal by duplicating the type of program already available. This continues to be true even as the number of broadcasters increases.

> A new station will duplicate an existing program type rather than producing an unproduced one, if the share it can get of the audience for the former type of program is greater than the total audience for the most demanded unproduced type.*

As the number of broadcasters increases, there will, however, be a tendency for new types of programs to be produced. How strong this tendency is will depend on the disparity between the sizes of audiences for various program types--the greater the differences in audience sizes, the greater the amount of duplication of the most popular programs.

The decision mechanism just described has another important consequence for viewers. Unless they are willing to watch only their most preferred type of program--i.e., they turn off their sets when any but their favorite program type is on--there is no guarantee (with a limited number of stations) that any viewer will be able to watch the type of program he most prefers. As discussed above, the viewer can respond to any given program only by watching or not watching. He may prefer one program to another, but if he is willing to watch either program, the broadcaster has no incentive to offer him the preferred type, since the broadcaster is compensated by the advertiser strictly on the basis of the volume of viewer time delivered. The claim often made for commercial television, that it gives most people what they want, probably is true; but the fact that there are large audiences for commercial programs does not logically imply, as is often suggested, that the majority of people are able to watch the types of programs they most prefer. It is possible, for example, that none of the audience for the most popular program regards the program as their first choice; the program may be most popular only because a large number of people don't dislike it enough to turn it off.

Industry Performance

From theoretical considerations, we now turn to the realities of the broadcasting industry. The number of broadcasters is limited.

---

*Steiner, op.cit., p. 200.

Only three national networks exist, and because of the economies of scale in programming, a very large portion of all programs reach viewers, at least in their initial showing, as network programs. There are 640 commercial television stations, but in only 22 cities are there more than three stations. The number of stations is limited by several factors. Because of frequency spectrum limitations, a limited number of stations have been authorized by the FCC. Even with the limited number of stations authorized, however, there are stations in most cities which are authorized but not yet broadcasting. In only four of the 100 largest markets, for example, are all of the frequencies allocated by the FCC for television being used. In many of these markets, the potential television audience is not yet large enough to permit profitable operation of the number of stations authorized by the FCC.

The audiences for many types of television programs--classical music, educational programs, etc.--are relatively small. (Audiences for various types of programs are discussed in detail in Appendix B.) This disparity in audience size and the limited number of stations both tend to limit the diversity of program types available to the television viewer. The tendency for commercial broadcasters to divide the audiences for the most popular program types rather than seek the audiences for less popular types of programs is thus based on sound economic ground from the broadcaster's standpoint. The tendency for networks to imitate successful program types is recognized by even the casual television viewer; thus, there has been a succession of programs similar to whatever is most popular at the time--situation comedies, adult westerns, and presently, feature films. Further, broadcasters are reluctant to broadcast a program that will attract a small audience, because such a program may reduce the audiences for programs which precede or follow that program in the broadcast schedule.

Information about the different types of programs provided by the commercial networks in a recent television season is shown in Table III-2.

Table III-2 shows quite clearly the disparity in the size of audiences for public affairs programs and the audiences for other types of programs. The inclusion of public affairs programs in regular network schedules would not be predicted by the theoretical analysis if the networks pursued a goal of strict profit maximization. For a variety of reasons, including pressures from critics both in and out of government, most broadcasters, like most businesses,

Table III-2
Commercial Programming in Regular Prime Time

Category	Number of Programs	Percent of Programs	Hours	Percent of Time	Average Cost (half hour)	Average Rating
Comedy	36	37.1	18.5	25.2	$67,100	16.9
Variety	13	13.4	12	16.3	69,500	16.6
Adventure/ mystery	10	10.3	10	13.6	78,800	15.5
Westerns	12	12.4	9.5	12.9	69,300	17.2
Feature movies	4	4.1	8	10.9	75,600	16.3
Series drama	6	6.2	6	8.2	69,800	14.2
Children oriented	4	4.1	3	4.1	68,200	16.4
Nighttime serials	5	5.2	2.5	3.4	67,600	17.9
Quiz participation	4	4.1	2	2.7	48,500	16.5
Public affairs	2	2.1	1	1.4	78,500	6.4
Nonseries drama	1	10.	1	1.4	75,000	19.7

Source: Spindletop Research, 1967.

do not attempt to maximize profits, and as a result even the limited diversity is greater than could be expected if broadcasters sought only to maximize ratings, and hence profits.

In practice, networks tend to continue to broadcast a program if the program attracts over 30 percent of the audience viewing television at the time. The cost of producing prime-time programs is great--one hour typically costs from $140,000 to $170,000 (see Table III-2). For a program to produce enough revenue to pay its costs and make an adequate contribution to the network's profit it must draw close to one-third of the viewing audience. Consequently, very few programs with smaller audiences are available on commercial television.

IV. DISCUSSION AND ANALYSIS OF ALTERNATIVES

TRENDS IN TELEVISION

The following discussion centers on the existing television industry with its components of network, commercial and noncommercial stations, CATV systems, and distribution facilities. Regulation of the industry by the FCC is also an essential facet. The expected development of commercial television to 1980 is analyzed but with two critical assumptions: No drastic policy changes will take place, and the extent of governmental regulation will remain the same as in the past. In other words, "normal" conditions will prevail.

The central point being discussed is alternatives for achieving greater television program diversity. Thus, an attempt is made in this section to estimate the extent to which diversity will be increased from its present state merely by what is termed the normal development of the industry. Certain factors of growth are interpreted as they apply to this expected development, and their effects on the various components of the industry are discussed.

At the present time there are approximately 58.6 million television households in the United States. This number is estimated to increase by almost 29 percent to 75.5 million television households by 1980. Slightly over one-fourth of the present number of homes are estimated to have color sets, and it is conceivable that this number may grow to three-fourths by 1980. An analysis of market size, using a preliminary listing from the 1968 Television Factbook* and allowing for market overlap, shows that the 25 largest markets contain 37.5 percent of the nation's television homes and that the "top 100 markets"† have almost 80 percent. A separate grouping of those markets, also derived from the Factbook, into those which have four or more stations and those which have three stations shows that the former group contains 42.6 percent of the total television homes, and the latter 33 percent, or a total of over 75 percent in those markets with three or more stations.

---

*Television Factbook. Published by Television Digest Inc., Washington. D.C., 1968-69 Edition, No. 38.

†The ranking determined by the American Research Bureau and based on net weekly circulation in the market.

One argument advanced to indicate diversity is the number of stations available. A recent study by the A. C. Nielson Company reported that the average household could receive 5.6 commercial television stations. This does not mean, however, that 5.6 program choices are available. No allowance is made for market overlap which often results in duplication of network programming. A more pertinent consideration here is the number of different program choices available to the average household. Since the networks represent only one choice each, additional choices must come from independent stations (ETV stations are not included because their coverage is difficult to determine and their schedules are often limited.) An analysis of the 70 independent stations in 45 different markets was conducted to determine how choice diversity is affected. Net weekly circulation figures were used as the base for estimating the numbers of households receiving the independent signal. Instances of overlap by independent stations have been allowed for.

Number of Stations	Percent Total U.S. Households
3 Network + at least 1 independent	39.6%
3 Network + at least 2 independent	27.6%
3 Network + at least 3 independent	23.1%

These data show that for more than half the nation, choice of programs is limited mainly to the three networks. Following is a discussion of the possibilities for change.

COMMERCIAL TELEVISION

Growth of Commercial UHF Stations

Any study which concerns the future of television must necessarily look closely at the past behavior of UHF television stations and make estimates of what growth may occur in the future. VHF television is not of major interest when discussing station growth since most of these channel allocations are already in use, and there is little possibility for further expansion. The June 17, 1968 issue of Television Digest shows there are 500 VHF stations now on the air, only 10 with permits but not yet on the air, and

39 with applications pending. This contrasts with the status of UHF television stations: 140 now on the air, 176 with permits but not yet on the air, and 72 with applications pending. Moreover, the February 1966 FCC table of UHF channel assignments contains almost 600 commercial assignments and more have been added since then.

It is thus clear that significant expansion in the numbers of operating UHF stations is possible. While construction permits and applications for stations represent an intent to operate, it is not clear what the degree of intent is nor what number of stations may actually result. This cannot be definitely known until the viability of these proposed ventures is tested in the market.

Introduction of All-channel Sets

A major retarding factor in the growth of UHF television in the past has been the fact that not all television sets were equipped to receive the UHF channels. However, since May 1, 1964, all newly manufactured sets are required to be able to receive both VHF and UHF channels. This requirement, coupled with normal set failure and replacement and demand for color sets (most all of which can receive all channels), has steadily increased the penetration of UHF receptivity to an estimated two-thirds of all television households. Inability to receive UHF signals is thus becoming less of a problem and is expected not to exist by 1980. By this time the differentiation between VHF and UHF stations will have virtually disappeared.

Two additional factors will also aid in the equalization. One industry group has attempted to persuade manufacturers to install easier and more accurate UHF tuners in newly manufactured sets. Viewer demand for simpler, more convenient tuning should result in this attempt becoming successful before 1980. Also, better transmitting equipment for UHF stations is being put on the market. This equipment can provide coverage equal to or greater than that of VHF facilities.* For these reasons, the audience for a station in any particular market will be dictated, not by whether the station is VHF or UHF, but by the performance of that individual station.

---

*Tebbel, John. "What Is Happening to UHF." Saturday Review. April 13, 1968. p. 90.

Financial Performance

Since over three-fourths of the operating commercial television stations are in the VHF range and have generally operated longer, with larger audiences and better network affiliation agreements, it is not surprising that the financial performance of UHF stations has been unfavorable. Profits for all UHF stations as a group have been attained in only four of the last 10 years. The table below gives selected financial data for the commercial UHF stations. Certain data for the period 1961 to 1963 was not isolated in the reports for those years.

Even though Table IV-1 does not portray a glowing record for UHF stations, gradual improvement can be noted with the exception of 1966. Until 1966, the number of stations reporting profits had increased to approximately two-thirds, while the total number of stations was also increasing. FCC data report that this loss is

Table IV-1
Selected Financial Data for Commercial UHF Stations

	1966	1965	1964	1963	1962	1961
Number of UHF stations reporting	114	100	92	86	83	81
Percent reporting profits*	59%	66%	68%	58%	57%	40%
Profits for all UHF stations ($millions)†	($7.4)	($0.2)	$2.7	$0.2	$0.9	($0.6)
Number UHF stations in four or more station markets	30	25	21	n.a.	n.a.	n.a.
Number reporting losses (in four or more station markets)	18	13	10	n.a.	n.a.	n.a.
Number UHF stations in three station markets	42	38	35	n.a.	n.a.	n.a.
Number reporting losses (in three station markets)	14	1	8	n.a.	n.a.	n.a.

---

n.a.--not available

*Represents only those stations in operation the full year.

†Parenthesis denote losses

Source: TV Broadcast Financial Data--1961 through 1966. Federal Communications Commission. Washington, D.C.

due to the experience of new independent UHF stations in major markets with substantial expense. This is evidenced by data on markets with four or more stations where 18 of 30 (or 60 percent) of the stations in operation the full year reported losses, compared with a figure of about half of the stations in the two previous years.

Growth in Number of Stations

Other FCC statistics show that between 1965 and 1966, the number of UHF stations increased 14 percent and revenues increased 20 percent, while expenses increased by 35 percent. The elusiveness of profits is even more clear when it is noted that almost half of all station profits in 1966 accrued to the 5 percent of the stations in the five largest television markets, which represented about 15 percent of all television homes.

Growth in the numbers of UHF stations can be seen from Table IV-2. Although there was a significant decline in the period from 1955

Table IV-2
Numbers of Commercial Television Stations

Year*	Total	VHF	UHF
1968	635	499	136
1967	610	492	118
1966	585	486	99
1965	569	481	88
1964	564	476	88
1963	557	466	91
1962	541	458	83
1961	527	451	76
1960	515	440	75
1959	510	433	77
1958	494	410	84
1957	471	381	90
1956	440	344	96
1955	411	294	114

---

*As of January each year.

Source: 1955 to 1967, Television Factbook No. 37. 1967 Edition. 1968, Television Digest. January 1, 1968.

to 1960, the last eight years have seen an increase of over 80 percent in the number of UHF stations on the air.

Additional information about UHF television stations can be gained from Table IV-3. Data are for the 226 television markets in a recent listing by the American Research Bureau ranked in order of net weekly circulation. Only the summary is given here, but the status of allocations in each market is shown in Appendix G. Information is also included on noncommercial stations and will be referred to later. Data for the first 100 markets were obtained from the FCC; the remaining data were compiled by the Spindletop staff. The figures are current to about March 1968. The approximation results from differences in the dates of the several source documents.

This table does not contain the status of all television channels which have been assigned by the FCC and, therefore, does not give the total picture. For instance, it was previously mentioned that there were 640 commercial television stations in operation as of June 17, 1968; a total of 569 is shown in this table. This is due partly to the elapsed time between March and June, but more especially because many stations are not considered within the bounds of the 226 largest markets. It can be seen, though, that there is ample room for expansion within the UHF spectrum. Approximately 40 percent of the allocated UHF channels in these markets are available for use and have not been assigned. This is contrasted with VHF which has only 18 allocated commercial channels not now on the air.

Table IV-3
Status of Television Channel Assignments

Classification	Commercial VHF	Commercial UHF	Noncommercial VHF	Noncommercial UHF
Channels allocated (non-com'l channels reserved)	461	468	68	233
Stations on the air	443	126	49	56
Authorized stations not on the air	6	122	1	13
Channels applied for	3	33	4	13
Available channels	9	187	14	151

Source: Federal Communications Commission, 1968.
Spindletop Research, 1968.

It is difficult to predict or estimate how many new UHF stations will be operating in 1980. Certainly, the data quoted from Television Digest and that from Table IV-3 show considerable planned expansion. The number which will come into being will depend, naturally, on their viability in operation, assuming that no drastic changes occur in the industry. Close to 500 stations are now affiliated with one of the three present networks; the remainder are either independent stations or have a per program arrangement with one or more of the networks. Because of the advertiser supported structure of the present industry, new stations must obtain their programming from a network or face a difficult and expensive time trying to compete for audiences which warrant advertiser support. The next part discusses the possibility of a fourth commercial network and its possible impact on UHF station growth.

Possibilities for Fourth Network

One alternative for achieving program diversity would be the emergence of a fourth commercial network. For this discussion it is assumed that this network is similar in scope to the present ones--with similar types of programs, amounts of network provided programming, and, therefore, expenses of the same order. These assumptions necessarily imply that the programming offered would be competitive with the present fare. Moreover, groupings of stations to form a "network" for the broadcast of special events are excluded since the amount of continuing programming offered is small.

Previous Spindletop work* has shown that an additional network of the type described is not viable at the present time. An attempt was made recently to start a new network, but the effort met with financial failure. Even the three existing networks are not entirely free from difficulties--the latest published figures show that ABC has lost money the last two years. But two significant changes will have occurred by 1980 which could affect the conclusions reached in the earlier study. All-channel receptivity, which was a limiting factor previously, will not be a problem then, and almost all homes will have at least one set which can receive both VHF and UHF broadcasts. Also, it is expected that there will be a significant increase in population by 1980. It is necessary to include the impact of these two factors in calculations relating to a possible fourth network.

---

*Expected Changes in Television. Spindletop Research. Prepared for Time-Life Broadcast, Inc. (confidential). July 1966.

Effect of Population Growth and All-channel Receptivity

The Spindletop work mentioned previously developed a model which estimated the minimum number of television households necessary at the present time (for the various market types) to support an additional UHF station. It is assumed that any new network station will be UHF, since almost all VHF stations are presently affiliated with a network.

Using the results of this model, it is possible to determine the effect that population growth and complete all-channel receptivity will have on the conclusions reached earlier. Television market size projections were made for each market using Bureau of the Census state population projections as a base. The number of homes in the markets increases at a faster rate than does population because of the expected decrease in numbers of persons per household--3.31 in 1965 as compared to 3.08 in 1980. Also, the assumption was made that 96 percent of these homes would have at least one television set. Each of the state growth rates was applied to the market to determine the projected number of television homes in that market for 1975 and 1980. Table IV-4 gives the results when the previously developed minimum number of television households needed to support an additional UHF network-affiliated station is matched with each of the market projections. The table shows, for example, that there are 22 one-station markets that could support a new UHF station by 1975, and 24 such markets by 1980.

Table IV-4
Stations Affiliating with a Fourth Network

Present Market Type	Number of Markets Capable of Supporting an Additional UHF Station		Expected Number of Stations Affiliating with a Fourth Network	
	1975	1980	1975	1980
1 station	22	24	7	8
2 station	22	26	11	13
3 station	53	56	53	56
4 or more stations	37	37	37	37
			108	114

Source: Spindletop Research, 1968.

These data show growth in the numbers of UHF stations which can be expected by 1980. The number of markets listed in the table for 1- and 2-station markets indicates there will be enough television households to support 44 additional stations in 1975 and 50 in 1980. This is due to the projected increases in television homes in these markets and the fact that by 1975 and 1980, almost all homes will be able to receive UHF. These figures indicate that diversity in programming can be furthered through normal growth in many markets.

Table IV-5 shows the status of channel allocations in the groups of markets selected as meeting the minimum size requirements for supporting an additional UHF network-affiliated station. The data show considerable activity in the larger markets but not as much in the 1- and 2-station markets, with all groups containing ample available channels. The 25 authorized stations and seven stations with applications pending in the 1- and 2-station markets would seem to support the estimate of new stations by 1980 that was made earlier.

Table IV-5
Status of Channel Applications

Present Market Type	Number of Markets Meeting Minimum Size Requirements	Present Number of Stations in Grouping	Authorized Stations not on air	Stations with Applications Pending	Available Channels
4-or more station markets	37	175	49	14	17
3-station markets	53	159	45	7	49
2-station markets	22	44	13	5	17
1-station markets	22	22	12	2	19
TOTAL	134	400	119	28	102

Source: Spindletop Research, 1968.

Using the right-hand portion of Table IV-4, the expected number of stations which might affiliate with a fourth network can be calculated. Assuming that the programming is comparable to that of existing networks, a fourth network might expect to receive its fair share of affiliations in those markets not presently served by the three existing networks, that is, one-third of the new stations in the 1-station markets and one-half in the 2-station markets. It is assumed that the new stations in the larger markets would elect to affiliate with the new network since this would represent a better economic venture. The totals of these expected station affiliates are 108 in 1975 and 114 in 1980. Both are slightly over half the number presently affiliated with NBC and CBS, and considerably smaller than the number with ABC. The 1968 Broadcasting Yearbook lists the following number of station affiliates for the three networks: NBC--201, CBS--192, and ABC--143. This would suggest that, given the expected growth in population, the feasibility of a fourth commercial network, similar to the present ones, seems to be a somewhat tenuous proposition. A final conclusion, however, should await the results of financial calculations of the feasibility of a fourth network.

Projection of Financial Data

It is desirable to project relevant network financial data to 1975 and 1980 to determine what effect the continuance of present trends in these data may have on the viability of a possible additional network.

Network Revenue

To compute the revenue resulting from network sale of time and programs to advertisers, a trend line was drawn for expenditures on total national advertising and is shown in Figure IV-1. The share of this national advertising which would be spent on network telecasting was determined by drawing a trend line of the percentage share of the total for network television and appears in Figure IV-2. The basic data for these graphs and the projected values for 1975 and 1980 are shown in Table IV-6.

These data project a growth in the network share of national advertising from its present level of under 15 percent to 17 percent in 1975 and 18.7 percent in 1980, or total time and program expenditures for network television of $2,486.6 million and $3,221.0 million, respectively.

The breakdown of total expenditures by advertisers between daytime and prime time telecasting was obtained from the February 5, 1968

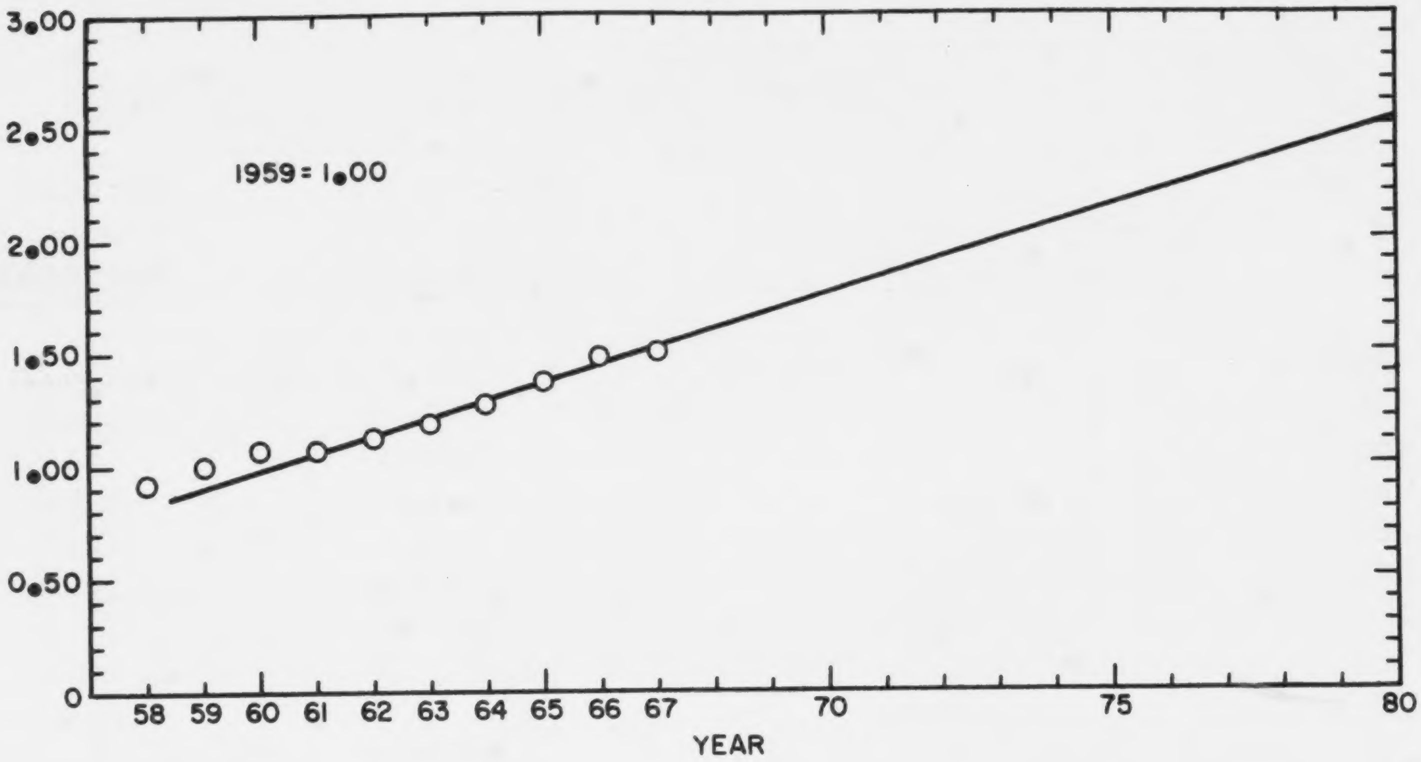


Figure IV-1. Total National Advertising Expendltures

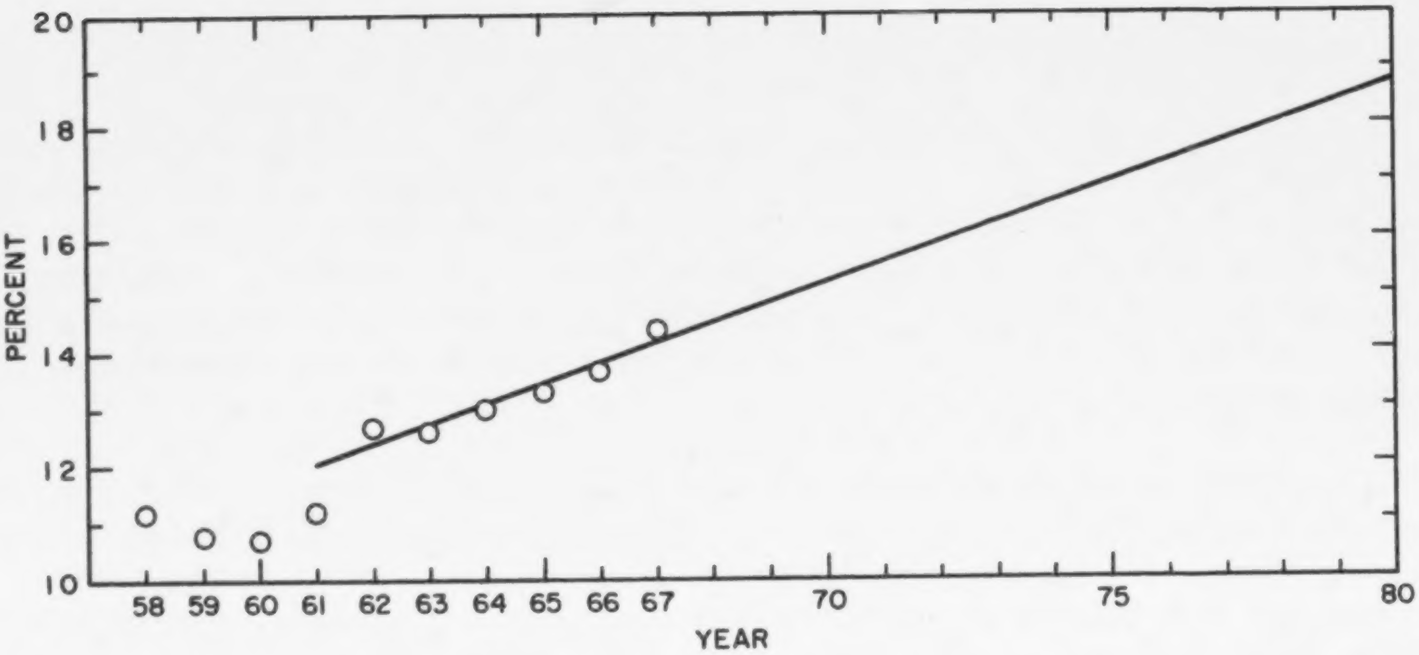


Figure IV-2. Network Television Share of National Advertising

Table IV-6
Network TV Advertising

	National Advertising (Millions)	Network TV Advertising (Millions)	Network Percent of National
1958	$6,331.0	$ 708.9	11.2%
1959	6,835.1	740.3	10.8
1960	7,295.9	782.9	10.7
1961	7,253.2	810.0	11.2
1962	7,660.9	975.5	12.7
1963	8,124.2	1,025.0	12.6
1964	8,712.8	1,132.0	13.0
1965	9,365.0	1,245.5	13.3
1966	10,176.0	1,393.0	13.7
1967	10,234.0	1,476.0	14.4
1975 (Est.)	14,627.1	2,486.6	17.0
1980 (Est.)	17,224.5	3,221.0	18.7

Source: 1958 to 1965, 1967 Television Factbook. Edition No. 37. p. 49a.
1966 to 1967, Marketing/Communications. March 1968. p. 81.

issue of Broadcasting. This shows that the billings in each of the last two calendar years have been 34 percent for daytime and 66 percent for prime time. This same relationship is assumed to hold true for 1975 and 1980. From this, the values of daytime and prime time expenditures and the cost-per-thousand households per hour to advertisers (CPM) can be calculated as shown in Table IV-7.

The household figures used in the equations represent the average network reach for each year (the percentage of total television homes viewing television at least once during an average week); assuming the percentages existing in 1966, the last year for which data are available, they are 74.4 percent for daytime telecasting and 92.8 percent for prime time telecasting. The total number of United States television households, as estimated previously, was 68.2 million in 1975 and 75.5 million in 1980. The hourly figures were derived by taking the broadcasting schedule of a fourth network shown in Table IV-8, which is similar to the average network of today, and multiplying by four to account for the additional network.

Table IV-7
Network Advertising

	1975	1980
Total Advertising Expenditures for Network Television	$2,486.6 million	$3,221.0 million
Daytime (34 percent)	839.4 million	1,095.1 million
Prime time (68 percent)	1,647.2 million	2,125.9 million
CPM to Advertisers		
Daytime	$ 1.90	$ 2.23
Prime time	$ 4.63	$ 5.41

Calculation of CPM:

Day: (1975) ($839,400,000/50,700,000 households)/8736 hrs. = $1.90

Day: (1980) ($1,095,100,000/56,100,000 households)/8736 hrs. = $2.23

Prime: (1975) ($1,647,200,000/63,300,000 households)/5616 hrs. = $4.63

Prime: (1980) ($2,125,900,000/70,000,000 households)/5616 hrs. = $5.41

Source: Spindletop Research, 1968.

Table IV-8
Broadcasting Schedule--Fourth Network

Prime time telecasting	27 hrs./wk.	1404 hrs./yr.
Daytime telecasing	42 hrs./wk.	2184 hrs./yr.

Source: Spindletop Research, 1968.

Network Expense

Network financial data published by the FCC were used to project program expense and general expense for the new network. Trend lines are drawn for each of the expenses (see Figure IV-3), and projected total amounts for 1975 and 1980 were calculated. The basic data and projected values are shown in Table IV-9.

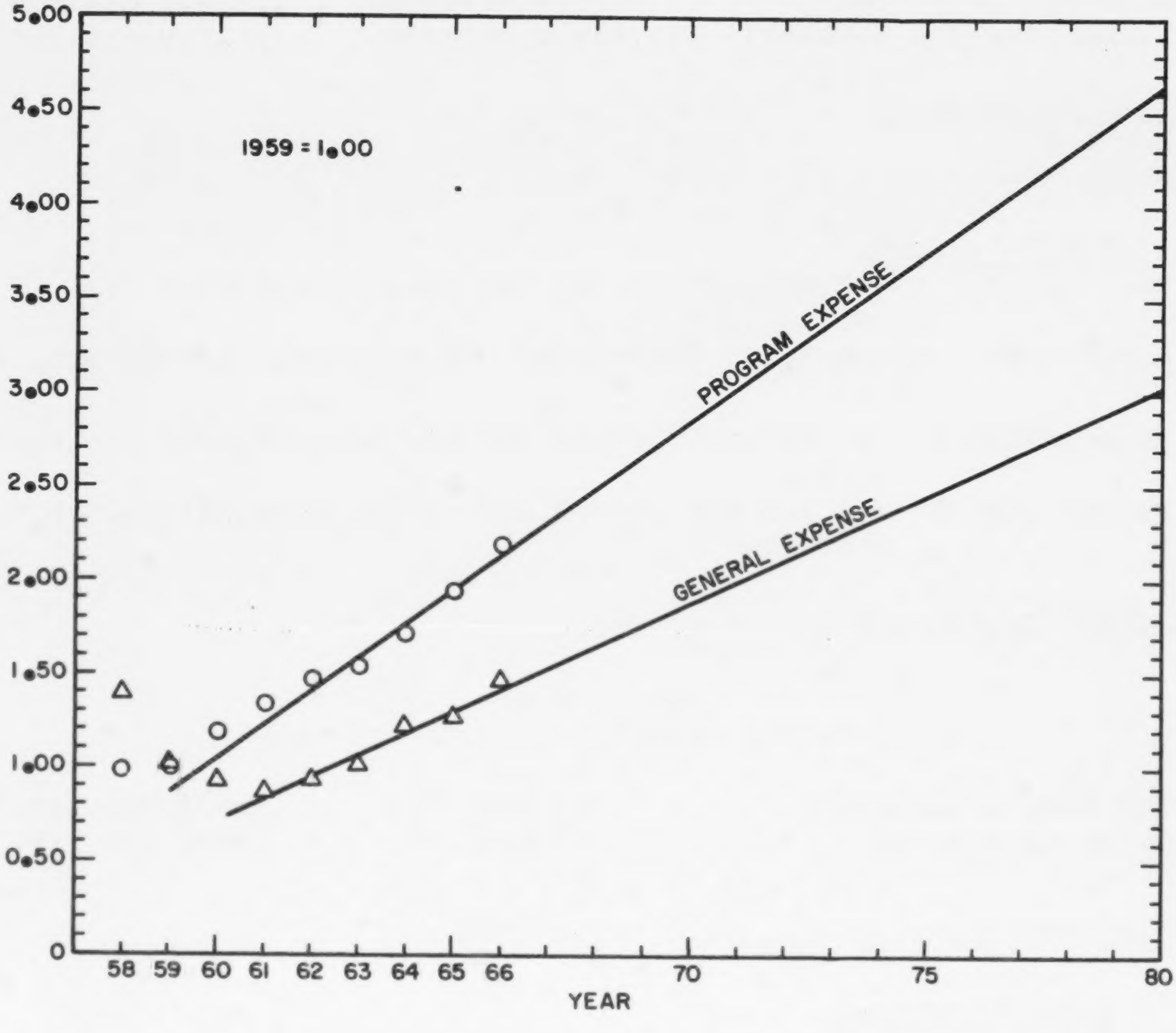


Figure IV-3. Projected Program and General Expense for New Network

Table IV-9
Network Expenses
(Millions)

	Program Expense	General Expense
1958	$ 312.6	$127.0
1959	316.1	90.5
1960	376.9	84.2
1961	423.8	78.0
1962	463.1	84.8
1963	487.2	92.3
1964	542.2	110.1
1965	614.5	114.8
1966	693.0	132.1
1975 (Est.)	1,182.2	222.6
1980 (Est.)	1,463.5	274.2

General expense includes: technical, selling, and general and administrative expenses.

Source: 1958 to 1966, TV Broadcast Financial Data. Federal Communications Commission.

The program expense figures include charges for network interconnections of about $45 to $46 million paid primarily to American Telephone and Telegraph for distribution of network television programming. Since it is assumed that the fourth network will be operated like the present ones, similar distribution charges are used. Adjustments in the figure because of the possibility of fewer affiliates or because of the possibility of the unfavorable geographical position of affiliates, when compared with the makeup of each of the present networks, could change the total slightly. Since this expense is such a small part of total network expenses, however, the analysis is not altered significantly.

The average network expenses for 1975 and 1980 were calculated by dividing the projected values given by three: program expense for a network in 1975, for example, is estimated at $1,182.2 million/ 3 = $394.1 million.

Break-even Coverage

It is now possible to use the revenue and expense projections which have been made to determine the coverage in television households which a prospective fourth network would require to break even. Revenues of the network are expressed in terms of revenue-per-thousand households (RMP) and is analogous to CPM for advertisers (see Table IV-10).

Table IV-10
Financial Projections for a Fourth National Television Network

	Daytime		Prime Time	
	1975	1980	1975	1980
Expenditures by advertisers for network television	$839.4 Million	$1,095.1 Million	$1,647.2 Million	$2,125.9 Million
CPM to advertisers	$1.90	$2.23	$4.63	$5.41
Gross RPM to networks*	$1.62	$1.90	$3.94	$4.60
Net RPM to networks†	$1.17	$1.38	$2.85	$3.32

*85 percent of CPM to advertisers; 15 percent of CPM constitutes cash and frequency discounts.

†52 percent of net RPM is revenue for time sales, and 53 percent of this is paid out. Thus, 27.6 percent of gross RPM is paid out and 72.4 percent retained.

Source: Spindletop Research, 1968.

The break-even revenue for the fourth network can be calculated by using the financial figures just developed in equations for total revenue and total expense as shown below.

$$R = (r_p h_p n_p + r_d h_d n_d)N$$

$$E = e_g + e_g$$

R = Expected net revenue for the network

N = Network coverage in thousands of television households

r_p = Net revenue per thousand households (RPM) for prime time telecasting

h_p = Number of hours of prime time telecasting per year, 1404 hrs.

n_p = Average network reach during prime time expressed as a fraction of N, 0.928

r_d = Net revenue per thousand households (RPM) for daytime telecasting

h_d = Number of hours of daytime telecasting per year, 2184 hrs.

n_d = Average network reach during daytime expressed as a fraction of N, 0.744

E = Total expense

e_p = Program expense, including distribution costs

e_g = General expense

$$N_{Break\text{-}even} = (e_p + e_g) / (r_p h_p n_p + r_d h_d n_d)$$

1975

$$(r_p h_p n_p + r_d h_d n_d) = (\$2.85)(1404)(0.928) + (\$1.17)(2184)(0.744) = \$5{,}620 \text{ per thousand households per year}$$

$$N_{Break\text{-}even} = (e_p + e_g)/\$5{,}620$$

$$= \$468{,}300{,}000/\$5{,}620$$

= 83,400 thousand households

= 83,400,000 households

1980

$$(r_p h_p n_p + r_d h_d n_d) = (\$3.32)(1404)(0.928) + (\$1.38)(2184)(0.744) = \$6{,}570 \text{ per thousand households per year}$$

$$N_{Break\text{-}even} = (e_p + e_g)/\$6{,}570$$

= 88,000 thousand households

= 88,000,000 households

It is apparent from the above that, even with the virtually complete penetration of all-channel receptivity expected in 1975 and

1980, a network coverage of this magnitude is clearly unobtainable since it greatly exceeds the projected number of total television homes expected by those years. We have omitted any possible revenues from network owned and operated stations, assuming that the network must at least break even on its other operations to be considered viable. The tentative conclusion reached earlier, based on the number of possible new stations which might affiliate with a new network, is therefore strengthened by the above data. We can thus infer that the prospects of a fourth commercial network would not be an economically attractive undertaking and should not be expected to become a reality.

Local Programming by Commercial Stations

Public policy has been to encourage the development of local television stations. The FCC's Sixth Report and Order (1952) gives high priority to providing each community with at least one television station. One reason for this concern with local stations is that they can fulfill an important role in the community by providing programs geared to the needs of the community. In this role, stations perform two functions: (1) They select and distribute programs that other groups have produced--either network programs or recorded programs obtained from non-network sources. (2) They provide their own programming.

Independent stations, of course, show few network programs, and generally have more local programming than comparable network affiliated stations. To the extent that local stations provide programming themselves, they represent a source of diversity in television. It is useful, therefore, to consider the local programming currently provided by television stations, and to consider whether any trends are apparent in such programming.

Data on local programming were collected from several sources. In Section IV-B of the Broadcast Application (TV) which each station files with the FCC every three years, broadcasters report the amount of local programming carried by the station in a composite week. A local program is defined as: "... any program originated or produced by the station, or for the production of which the station is substantially responsible, and employing live talent more than 50 percent of the time." Spindletop examined a sample of 188 such applications, and found that these stations broadcast an average of 14.6 hours of local programming during the composite week. Table IV-11 shows the amounts of local programming provided by stations of various sizes at different times during the day.

Table IV-11
Local Programming
(hours per week)

Station size (net weekly circulation)*	Time of Day			
	8 a.m. to 6 p.m.	6 p.m. to 11 p.m.	Other	Total
less than 100,000	5.6	4.0	1.8	11.4
100,000-200,000	5.9	4.5	2.1	12.5
200,000-400,000	7.5	4.1	3.2	14.8
400,000-600,000	8.3	4.4	5.9	18.6
600,000-1,000,000	9.2	4.5	7.7	21.4
over 1,000,000	10.0	4.3	7.4	21.7
Average, all stations	6.9	4.3	3.3	14.6

*Net weekly circulation from American Research Bureau.

Source: Spindletop Research, 1968.

Table IV-11, which includes only network affiliates, shows a clear relationship between the size of a station (measured by n.w.c.) and the amount of programming done by a station. The time-of-day information, however, shows that during prime time, the amount of local programming provided by the stations does not vary significantly with the size of the station.

Nature of Local Programming

In order to obtain more information about the nature of local programming, Spindletop and the NAB surveyed 56 stations for data on their local programming. (The survey forms and complete tabulation of results appear in Appendix C.) The amounts of various types of programming reported by the stations are shown in Table IV-12.

The total hours shown in Table 14 are greater than in Table 11 for several reasons. There is some overlap in the program types in Table 12. In addition, stations were asked to report all local programming, regardless of the amount of time live talent was used in the program. (The FCC definition of local programming requires use of live talent at least half the time.)

Table IV-12
Average Hours of Local Programming Per Week--1967
By Size of Station*

Program Category	Less than* $500,000	$500,000- $999,999	$1,000,000- $1,499,999	$1,500,000- $1,999,999	$2,000,000- $3,499,999	$3,500,000- $4,999,999	Over $5,000,000	Not Reported	All Stations
Agricultural	1.0	1.1	0.7	1.4	0.6	0.9	0.4	1.5	0.9
Entertainment	3.9	1.5	2.7	2.7	5.1	5.6	5.4	1.4	3.3
News	5.0	5.6	6.5	5.8	5.4	7.3	9.2	11.6	6.8
Public Affairs	1.5	3.1	1.3	1.2	1.5	1.6	1.6	3.4	1.9
Religious	1.9	1.0	1.5	1.4	1.3	1.2	1.1	2.2	1.4
Instructional	1.6	0.5	0.9	0.2	1.7	1.3	1.1	2.1	1.1
Sports	2.4	1.3	1.6	1.5	2.0	0.9	2.2	0.8	1.6
Editorials	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.3	0.1
Political	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.1
Educational	0.4	0.6	0.8	2.6	1.1	0.7	0.7	3.1	1.0
Other	1.6	0.4	0.6	0.0	0.7	1.8	0.8	1.4	0.8
TOTAL	19.4	15.3	16.8	16.9	19.4	21.3	22.8	27.8	19.0

*Size determined by advertising revenue.

Source: Spindletop-National Association of Broadcasters Survey, 1968.

In Table IV-12, over one-third of local programming is news, which includes both local and national news reported by a local announcer. Entertainment, the next largest category, makes use of local talent, but probably includes programs similar to those available from other sources. Public affairs and sports programs are clearly related to the local community and not available elsewhere.

Audiences

Audiences for local programs for the stations in the survey are shown in Table IV-13. This table gives, for the average station in the survey, the total audiences for all programs of the indicated type. These figures give some indication of the importance to local audiences of the programs produced by the stations. For example, religious programs, while broadcast a significant amount of time (1.4 hours per week as shown in Table IV-12), have quite small audiences. Political programs, on the other hand, use insignificant amounts of time (1967 was not an election year), because few stations reported such programs; but these programs did attract significant audiences. The average net weekly circulation for the stations in the survey is 425,000 households. The total audiences given in Table IV-13 are not cumulative audiences, i.e., each time a household viewed a program it was counted in the audience. The audience figures in Table IV-13, therefore, count a single household watching a program at three different times during the week the same as three different households watching a single program.

Table IV-13
Total Quarter-Hour Audiences for Local Programs

Program Category	Number of Stations Carrying Programs	Total Audiences (thousands of households)*
Agriculture	37	45.4
Entertainment	40	265.5
News	51	929.2
Public Affairs	47	80.8
Religious	46	32.1
Instructional	24	169.3
Sports	41	359.8
Editorials	13	302.8
Political	5	379.9
Educational	29	29.6
Other	15	83.4

*Average of stations carrying programs.

Source: Spindletop-National Association of Broadcasters Survey, 1968.

Trends in Local Programming

The preceding discussion has described present local programming practices. There is little evidence to suggest that significant changes are likely to occur in the future. Table IV-14 shows trends in local programming.

Table IV-14 suggests that the amount of local programming has not changed significantly in the last 11 years. Local programming furnished by independent stations has decreased in the last five years; this may be due to the movement of independent stations into smaller markets, and the tendency for smaller stations to do less local programming. On the basis of these data, it seems reasonable to assume that in the future the amount of local programming will remain at about the present level.

One exceptional example of local programming is not covered in the above summaries of station operations and should be noted here. In Muskegon, Michigan, a small UHF station is attempting to prove viable a different concept of local station operation. This station, WKMG, operates in a community that is served by three network affiliated stations, but which had no local station prior to WKMG's coming on the air. The station has a limited schedule of programs,* and all but one program per day are locally produced. The station's monthly expenses are held down by the use of part-time employees and simple production techniques; monthly expenses are about $10,000 to $12,000, compared to an average of about $38,000 for stations in comparable small markets. In the evening, WKMG carries talk programs that are devoted to local issues and that include viewer participation, and also carries local events such as high school sporting events and local parades. The station has achieved 30 percent share-of-audience with high school sports events, and the talk programs have obtained 22 percent share-of-audience. Of particular interest for this study is the fact that WKMG's operation appears to be economically viable--the station is operating at a slight profit after one year on the air.

---

*Data on station operations were obtained by telephone from Mr. Andrew E. Jackson, Station Manager of WKMG.

Table IV-14
Local Programming
(hours per week)

Date	Network Affiliates			Non-Network Stations			All Stations		
	Local Live	Local Videotape	Total	Local Live	Local Videotape	Total	Local Live	Local Videotape	Total
June 1967	12:25	3:14	15:39	18:30	3:56	22:26	12:56	3:17	16:13
June 1966	12:26	3:40	16:06	18:06	6:00	24:06	12:47	3:49	16:36
June 1962	12:48	2:18	15:06	24:37	4:39	29:16	13:42	2:26	16:08
October 1956	12:47	N/R	--	14:44	N/R	--	12:50	--	--

N/R = Not reported

Source: 1968 Broadcasting Yearbook. Washington: Broadcast Publications, Inc. 1968.

Other Changes Expected

Diversity in one form--variety in programming--may be increased by certain changes which appear to be taking place in the industry. The most apparent change is seen in the popularity of movies and the subsequent reliance by networks on this type of programming. Movies now account for about 16 percent of all prime time programs and about 20 percent of the money spent on prime time programming by the networks.* Old movies are also available to individual stations through syndication and "... fill about 40 percent of the purely local-time periods on United States stations."† Because of the differences in reimbursement for advertising--a third of the rate when originated by the network but all of it when originated locally--it is conceivable that the networks' control over this type of fare could decrease. Although past efforts to purchase movies have not worked out well, groups of stations should be able to pay as much as the networks for movies and other special shows, making the networks less important as program suppliers.

Plans for the coming television season (1968-1969) offer evidence of this trend. Of the 435 specials which are planned, 235 will come from the networks and 200 from station groups and syndicators.‡ These figures represent an absolute increase from last year of ten specials, but this year 60 more specials will come from the station groups and syndicators--two of which will produce 88 of the 200 being planned. If this activity should increase measurably, there would be a corresponding decrease in the need for networks. The proposed "50-50" rule on network control of programming (FCC Docket No. 12782) might encourage the development of independent program packagers.

The opportunity for presenting special event coverage by anyone other than the networks is now limited, partly because the networks can outbid competitors, but also because the rate structure for program transmission and interconnection is usually prohibitive for anyone who desires the service for periods of less than eight hours. Some form of change in the rate structure so that purchase of these occasional services would be economically justified by independent program suppliers is likely and would result

---

*_Forbes_. December 15, 1967. p. 24.
†_Ibid_.
‡_Broadcasting_. May 27, 1968. p. 23.

in a greater variety of programs being offered. Sixty percent of the expenses of Sports Network, Inc. (SNI), relate to network interconnection costs; if interconnection costs for shorter time periods (e.g., three hours) were proportional to the eight-hour rate, SNI programming activities would expand.*

Another change which might result in more variety is the subject of a current FCC proceeding† concerning contract exclusivity agreements between program suppliers and large market stations which act to restrict small market stations from obtaining non-network material. If a rule results which grants exclusive use only in a station's community of license, as is true now for network programs, additional syndicated programming would be available to small markets; on the other hand, such a rule could discourage syndication activities.

COMMUNITY ANTENNA TELEVISION (CATV)

Growth of CATV

The history of the growth of CATV can be seen in Table IV-15. These figures show a penetration of almost 5 percent of the nation's television homes at the start of 1968. As of June 17, 1968, more than 2,000 systems were operating, over 1,800 had been granted franchises but were not yet operating, and almost 2,300 have applications pending. This would seem to indicate a great deal of intense growth. Of the 2,000 systems operating at the start of 1968, over 1,100 have fewer than 1,000 subscribers each compared with 27 systems which serve over 10,000 subscribers each. Thus, the range of system size is considerable. Also, the assumption by the FCC of regulatory authority over CATV in early 1966 does not appear to have greatly retarded growth. The number of new systems added in the past two years is about the same as in the previous four years. Although it is probable that the absence of any regulation would have resulted in somewhat greater growth, its possible extent is unknown.

Presently, the existence of the top 100 markets rule has restricted growth in those markets, and it is assumed here that this type of FCC posture will continue. Although the rule was instituted to protect the development of new independent stations who will benefit from the all-channel legislation of 1964, it also allows the Commission time to determine whether or not CATV operations in major markets serve the public interest before these operations become significantly entrenched.

---

*Conversation with Mr. Richard Bailey, President of Sports Network, Inc.

†Broadcasting. May 13, 1968. p. 64.

Table IV-15
Growth of CATV

Year	No. of Systems	Total Subscribers
1968	2,000	2,800,000
1967	1,770	2,100,000
1966	1,570	1,575,000
1965	1,325	1,275,000
1964	1,200	1,085,000
1963	1,000	950,000
1962	800	850,000
1961	700	725,000
1960	640	650,000
1959	560	550,000
1958	525	450,000
1957	500	350,000
1956	450	300,000
1955	400	150,000
1954	300	65,000
1953	150	30,000
1952	70	14,000

Source: Television Digest, May 13, 1968. p. 3.

Two of the three most important subject areas relevant to CATV have recently been somewhat settled by Supreme Court decisions; Congressional action, however, could alter the results. The Court has affirmed FCC power to regulate CATV and ruled that CATV systems that do not originate programs are not presently liable for copyright fees. In the area of program origination, the FCC has taken the position that CATV's may originate programs, subject to rules the FCC may adopt, but that origination of commercials is not permissible. Any attempt to estimate the future growth of CATV must naturally take the impact of these Supreme Court decisions into account. The economic viability of CATV is firmly established, whether the system operates in small rural communities with few subscribers or in larger metropolitan areas with many subscribers. The average yearly outlay of around $60 by subscribers does not seem to be a repressive factor; the stronger signal, better color reception, and more stations than usual balance out the cost.

Growth will be determined more by where future regulation places CATV in the industry structure than by the market demands for the service. Nevertheless, some considerations for the future can be advanced. A simple trend line of the number of systems each year gives an estimate of around 4,250 systems in 1980, or almost 8 percent of the estimated total television homes for that year. This assumes that recent trends will continue into the future and that the average number of subscribers per system will remain at present levels of 1,400. This estimate, however, is probably conservative. It does not take into account the maturing of those systems presently operating, with subsequent additions in numbers of subscribers; nor does it include the probable growth of systems in larger population areas. Even with the top 100 market rule restricting distant signal importation, growth will occur in these larger areas. Additional program origination by CATV's, coupled with the advantages of clearer reception and AM and FM broadcasts, will present a desirable package to the viewer. Other work by Spindletop in estimating market penetration for consumer recreation items suggests that for a yearly cost of $60 and usage per year of 400 hours, or slightly over one hour a day, the expected penetration is about 35 percent. When this usage increases to 2,010 hours per year, or the present average of 5.5 hours viewing per day, the penetration increases to about 50 percent. This naturally assumes the items to be purchased are homogenous throughout the population and the item is available to all--the decision factors being cost and amount of usage. While these assumptions are not entirely true in the case of CATV, the analysis does suggest that an estimate of CATV penetration by 1980 should be greater than 8 percent; probably in the order of 20 to 25 percent, or 15 to 20 million television homes. This assumes that the industry structure will not be drastically changed in the period.

Trends in Program Origination

The central point addressed in this report, however, is television diversity, and program origination by CATV's can measurably increase the numbers and types of programs available to viewers. While the number of homes now reached by cable is only around 5 percent, growth to the estimated 20 percent of the nation's homes represents a significant portion of the population; and operations which increase the viewing diversity of this group are an important consideration. Now there are no prohibitory rules governing CATV program origination, although efforts to promote such rules have been made. The recent court decisions relating to FCC regulatory authority over CATV and the FCC authority over CATV and the FCC position on program origination, together with a presumed continuance of restrictions on distant signal importation into major markets, could increase the extent of local CATV program origination. Since the system cannot bring in the signal of a distant, independent station and thus offer the subscriber programs in addition to those available over the air, program origination by local CATV systems would make the service more attractive to the consumer. On the other hand, the fact that the copyright decision did not include consideration of systems that originate programs may make CATV operators cautious in originating programs.

Ample channel capacity is available in most CATV systems to provide programs in addition to those of the three networks. An analysis of the FCC 1966 CATV Operational and Ownership Data report shows that 53 percent of all systems then in operation were those of 12-channel capacity and another 35 percent provided five channels. Also, industry sources report that most of the new systems being installed are of the 12-channel type. Thus, channels are available to carry the programs if these programs are forthcoming. The differences in income resulting from a local, network-affiliated station presenting its own program in prime time instead of the one provided by the network are so great that is it done only in exceptional cases, e.g., regional groupings of station's for sports events. Since the prime time evening hours are also the hours when the greatest number of possible viewers is available, a unique opportunity is provided the CATV system to offer other programming on the extra channels. This programming may be entertainment or it may be the type that contributes to community self-expression. There are local events, such as community sports, for which broadcast stations and CATV's are not in competition, and their offering on cable would be a worthwhile endeavor.

Program origination by CATV's is not wholly advantageous, however, in fostering program diversity or in providing maximum service to the public. It has been mentioned that the segment of the population which will eventually be served by CATV is an important one, but the service to the other four-fifths of the public must be considered. Because program origination by CATV's is a form of subscription television, all of the concerns that are expressed about the impact of pay TV on "free" television must be dealt with. It is not inconceivable that a combination of CATV systems could outbid a network for certain movies, for instance, which would then be shown only to the CATV subscribers and not to the general public as had been planned.* Rules similar to those proposed for pay TV could be developed for CATV originations, e.g., a classification of programs could be developed in which certain mass appeal entertainment programs would be foreclosed from CATV showing but local sports and news would not. Another consideration which may cause some form of origination restraint is the power which the CATV operator exercises over these extra channels. Since such concentration of control of communications channels violates well established public policy, some regulatory control over access to these channels will likely evolve.

---

*One film program service for CATV was reported in TV Digest. February 12, 1968. p. 6.

The conclusion, then, is that program origination by CATV systems is likely to increase but with some degree of control exercised by the FCC. The operations of the local broadcast stations will continue to be protected by regulation, but the opportunity for CATV systems to serve as a "local" television station for the individual communities may be recognized and encouraged. This path would seem to maximize the television diversity for the public while allowing both CATV and broadcast stations to grow and prosper. By permitting limited tests of different systems or services, the authorities can gain experience helpful in determining final makeup. Substantial reorganization or change of the *status quo* is thus delayed, which assures that little will happen overnight and without some form of tacit public approval. This course of action is augmented by the desire of Congress for hearings and other means of achieving public expression before action is taken, and by the legal channels of appeal and review which are available to concerned parties.

Although the Supreme Court copyright decision did not deal with CATV's that originate programs, CATV program originations are likely to expand. Since there is no requirement for the local CATV operator to provide any more hours of programming on unused channels than he can economically justify, it will be possible to expand the number and types of offerings in a gradual manner and as dictated by local demand. Some factual data on origination by CATV's has recently become available. Although the data does not include all systems, the numbers indicate a trend toward increasing origination. A survey by the National Cable Television Association (NCTA), reported in the March 11, 1968 issue of Television Digest, found that 161 systems, of the 324 replies, originated some programming, and another 65 planned to. Even though the kind of origination most offered was time and weather (by 153 systems); sports, news, films, and city council meetings were offered by some 30 others. Also, slightly over 10 percent accepted advertising, and almost as many were planning commercials.

Another survey undertaken by NCTA, at the request of Spindletop, sought to explore the origination of local, live programming only and excluded wire service news, time and weather, and FM music. Questionnaires were sent to those systems who had reported originations in the survey mentioned previously and 48 replies were received. In order to preserve confidentiality, Spindletop was given the results in tabular form listing the number of originated hours by category and the number of systems reporting that amount of origination.

A summary of these results appears in Table IV-16. The median figure shows the number of hours per week for which as many respondents reported "fewer than" as reported "more than." The average figures were derived by totaling the number of originated hours reported and dividing by the number of systems answering that particular category. The same procedure was used to obtain the figures for cost of the origination equipment, exclusive of studio.

Table IV-16
Summary of Cablecasting Questionnaire

Category	Median (hours per week)	Average (hours per week)
Local news	2.0	2.3
Education	2.0	5.8
Sports		
Live	2.0	2.5
Tape	1.5	1.7
Sports news	1.0	1.7
Local public affairs	1.0	2.3
Entertainment	1.5	5.9
Religion	0.5	1.3
Subtotal	11.5	21.8
Total hours per week of local programming	9.0	14.6
Man-hours per week for each hour of programming	3.0	4.0
Cost of origination equipment	$10,500	$17,200

While these data do not purport to represent all CATV systems, they do show what is possible. Thus, some small portion of the public is presently receiving a significant amount of locally originated programming presumed to be substantially different from and in addition to that provided by local broadcast stations and the networks. The subtotal of the six categories shows the median number of hours per week to be 11.5, and the average number of hours per week to be 21.8. This is of the order of 1 to 2 hours per day of additional programming. These figures are somewhat higher than those in the category--Total hours per week of local programming--because the latter included political, agricultural, and other categories for which there were few responses, and contained usable responses from all 48 replies. The individual categories in some cases had such answers as: "occasionally," "reasonably," "upon request," and some listed no answers. Even with this difference, the amount per day of additional programming remains 1 to 2 hours. Another question in the survey pertained to to whether or not the system accepted advertising. Forty-five percent reported "yes."

Trends in Organization

Another aspect of the CATV industry about which little is known is its structure. It has been previously mentioned that the range of size of the individual system is considerable, with over half serving less than 1,000 subscribers, but with 27 having customers numbering more than 10,000. The degree of multiple ownership is unclear, but there is no doubt that it is present and increasing. Moreover, the concentration of control in the hands of segments of the communications industry is reaching significant proportions. The April 15, 1968 issue of Television Digest reported that 41 percent of the CATV systems started in 1967 are owned by broadcasters (46 percent in 1966); and the 1968 Broadcasting Yearbook states that broadcasters presently account for 30 percent of the ownership of all CATV's. Also, although the companies in the Bell System are precluded from owning CATV's, several independent telephone companies include CATV systems among their investments. Such concentrations, particularly by broadcasters, are likely to be scrutinized by the FCC and will probably result in some form of control. A precedent is found in the present limitations on the number of radio and television stations which may be owned by one organization. The effect of such restrictions, while lessening the amount of readily available investment capital, would not seem to retard CATV growth over a long period of time and would assure more and different sources for the origination and control of programming offered by cable. Most significantly, the growing presence of broadcasters in CATV will weaken broadcasting opposition to CATV.

Since, in the past, individual CATV systems have not been obligated to report accurately on all facets of their operations, the data available on the industry have been less than is desirable for extensive analysis. Now that the regulatory authority of the FCC over CATV has been reaffirmed, it can be expected that more information will be forthcoming. This will allow for more complete and accurate investigation, and subsequently, more useful results which will be helpful in policy determination.

EDUCATIONAL TELEVISION

Noncommercial television is an important contributor to program diversity. Noncommercial television is distinguished from commercial television in two ways: Its source of income and its objectives are different. Commercial television is supported primarily by advertising, while contributions, foundations, and government support the noncommercial sector. Commercial television attempts principally to provide that type of programming which will attract large audiences and thus warrant advertising sponsorship--mass appeal entertainment and national and international news. Noncommercial television, on the other hand, exists primarily to serve the educational needs of the community and advance educational programs.* In doing this, educational broadcasters attempt to reach various limited audiences, rather than mass audiences. There is a responsibility to the community, but the economic pressures extant in commercial television are not dominant.

Moreover, noncommercial television is composed of two distinct segments--instructional television, usually carried on during daytime hours in conjunction with educational institutions, and what has been termed by the Carnegie Commission on Educational Television as "public" television which includes the remainder of the programming conducted by these stations, usually carried in the evening hours and on weekends. Only "public" television is relevant to this study.

The types of programs offered by the two sectors of the television industry may sometimes overlap, but the important point is that ETV (synonymous here with "public" television), generally offers significantly different, and additional, program choice to the viewing public, and thus contributes to greater television program diversity. Since this section of the report explores the normal development of the industry to 1980, it is necessary to analyze the past growth of ETV and make some assessment of the future.

---

*FCC Rules and Regulations, Part 3, Subpart E, § 3.621(a).

Growth of Local Stations

The growth in numbers of stations has been significant. The June 17, 1968 issue of Television Digest reported that 162 noncommercial stations were then operating, 35 more had permits but were not on the air, and 24 applications for stations were pending. The number presently operating represents a 90 percent increase in the last 5-1/2 years.

A separate analysis of the 226 commercial television markets mentioned previously (see Table IV-3, page IV-6), shows, that of the 301 channels reserved for ETV use, 105 are on the air, and 14 others are authorized. Also, in these markets, there are 165 channels which are available. Although there are many ETV stations in smaller communities, they are mostly satellite stations and rebroadcast signals from a parent station and also are not included in the market definition; it is instructive to look further at the data on these particular markets. There were 63 markets in the top 100 which contain an ETV station, but only 20 in the remaining 126 markets, or a total of 83 out of 226 markets with an ETV station. Moreover, only in 10 markets now without stations is one authorized, and only in 16 others is there an application for an ETV station pending.

These data would seem to suggest that the coverage of the present ETV stations is such that maximum availability of the programming has not been reached even when the coverage of the additional stations is included. Approximately three-fourths of the population, however, are now within reach of at least one ETV station.* Coverage may be limited, though, even in markets with ETV stations. The physical plants of some stations probably result in decreased reach when compared with commercial stations. In general, the transmitting equipment is less expensive, the towers are not as tall and may be located on less desirable sites. This follows from the high cost of prestige equipment and locations and from the limited funds usually available for ETV station construction. Another consideration is the practice of many stations to broadcast five or less days per week--in 1965-1966, 63 percent of the stations followed this practice. Also, at that time, only 15 percent of the stations broadcast seven days a week. While these relationships may have changed in the interim, the relative weightings probably have not. This means that during a substantial portion of the hours when the number of potential viewers is highest, the programming is not being offered.

---

*A Progress Report, 1967-68. National Educational Television. p. 1.

There are factors, however, which will serve to brighten the outlook. At the close of Fiscal Year 1967, plans for 39 state networks were on file with the FCC. These efforts, enhanced by state funds with consequent requirements for attention to the public interest, should provide stations so located as to reach a maximum number of viewers. More significantly, in November 1967 the Corporation of Public Broadcasting (CPB) was created by law. Among its objectives are to increase the total amount of available programs and to serve as distributor of funds. Although the organization is still in its infancy, and the sources of funds have not been determined, a focal point for endeavors exists and has the potential of measurably increasing the diversity of programming available to the public.

Another factor which will result in greater coverage is the disappearance of all-channel receptivity as a limiting aspect. There are now more UHF than VHF stations on the air, and over four times as many UHF channels reserved. By 1980, the two will operate on relatively equal terms. The summary effect of these factors will be to increase the total coverage of ETV programming from its present state, thereby providing a greater part of the nation with an alternative programming choice.

The fundamental structure and operations of noncommercial television make forecasting particularly difficult. It is cast outside the realm of a market economy, thus rendering traditional economic analysis ineffective. Decisions about the future are not made under competitive conditions, but rather are dictated by political and social considerations. For this reason, the usual tools of business analysis do not apply, and reliance must be placed instead on expressions of intent, tempered by experience and objective analysis.

Two such expressions pertaining to a national ETV system are that advanced by the National Association of Educational Broadcasters (NAEB)* and that contained in the Carnegie Commission Report.†

---

*Educational Television Broadcasting: A Five-Year Projection. National Association of Educational Broadcasters. December 1966.

†Public Television--A Program for Action. The Report of the Carnegie Commission on Educational Television. New York: Bantam Books. January 1967.

The total number of stations proposed by these plans, 364 and 380, respectively, would provide a situation of maximum coverage for the nation, which is calculated in the Carnegie Commission Report to reach 94 percent of the nation's television homes with at least a B Contour signal. As mentioned previously, about 75 percent of the country can presently receive an ETV signal. By 1980, then, ETV coverage of the nation will lie somewhere between these two figures. The actual coverage, and the number of stations, cannot be estimated accurately. The inactivity of applicants for ETV channels has already been mentioned, but this is due to inadequate funds. No economic incentive exists since, by law, these stations are nonprofit. Therefore, construction of facilities and financing of operations must wait for funds to become available. Because the amount of these future funds is unknown, estimates must be based on what appears likely. The NAEB plan* listed those stations in operation at that time, those due to begin operation by 1968, and those which were planned but for which no funds were then available, making a total of 213 stations. Moreover, this number is just slightly less than the present-day total (221) of those stations which are operating, applied for, and authorized. Something on the order of these numbers of stations would therefore seem to be entirely likely and would provide an increase in coverage placing 84 percent of the nation's television homes within range of an ETV station if all station authorizations and applications are executed. Since this situation would probably be reached before 1980, additional growth can be expected. The exact amount is uncertain, but if those of the top 100 group still without an ETV station are assumed to be included, the resulting coverage will be greater than 90 percent of all television homes.

Concerning diversity, then, it can be said that assumed normal development, reinforced by the efforts of the CPB, will bring about a situation where substantially more households will have the opportunity of watching educational television than is now the case. Also, the quality and amount of programming will increase. The proportion of stations broadcasting every day is likely to grow so that most of the stations located in the major markets will offer a viewing alternative to commercial television during the evenings and weekends.

---

*National Association of Educational Broadcasters, loc.cit.

Increase in Resources for Programming

In the preceding paragraphs, it was concluded that over 90 percent of the nation's television homes are likely to have access to ETV by 1980. However, if they are to watch ETV, the programming offered will have to be relatively attractive to them. This necessitates an increase in the resources for programming. The difficulty of raising funds has already been mentioned. Basically, there are three financing alternatives for ETV programming: viewer support, public support, and special group support. The Carnegie Commission has proposed a combination of the first two--an excise tax on television sets combined with contributions by governmental and private sources. Up to the present, governmental and private sources have contributed most of the money for ETV, and precedents for the suggested excise tax are not hard to find. It seems obvious that a substantial part of any funds for ETV programming will necessarily have to be provided by the federal government, even allowing for those amounts which can be raised by other methods.

The first category of support--from the viewer--could include the excise tax, an annual tax on set ownership, or a charge based on use. The charge based on use is unlikely since the cost of collection would probably be prohibitive. The first two suggestions, however, are certainly not impossible. The annual tax is the method successfully used in the United Kingdom, and it does provide a broad base for financing since approximately 95 percent of the nation's homes own a television set. The excise tax would be a one-time charge collected when the set is sold and at a time when the cost can be more easily afforded by the purchaser.

The second category would include all levels of governmental support as well as contributions by foundations, organizations, and individuals. The last category would take the form of a direct or indirect tax on special groups who might include the commercial broadcasters, their advertising sponsors, or the users of communications facilities (if a domestic satellite were to be used). Another source of funds, which falls in this third category, would be to allow limited advertising sponsorship of certain types of programs, although this could cause shifting of money from commercial television.

Funds in varying amounts could be made available annually merely by varying the percentages or amount of tax, but these estimates are not critical. The point is that, within reason, the quality and amount of programming is proportional to the funds available. If future programming follows the established pattern of ETV programs, then diversity will increase as the number of heavy entertainment, educational, and information programs increases. On the other hand, government support for programs does not completely free the program decision maker of the necessity to provide programs that will be watched by large audiences. As governmental support grows, so may the demands by taxpayers for programs that have wide appeal.

Impact on Existing Industry

A critical consideration in the growth of ETV is its impact on the existing commercial television industry. Certainly the latter's importance and influence is such that any policies adverse to commercial interests will meet with well-organized opposition--which will probably be successful unless proposed changes are justifiable. However, it does not appear that the type and amount of ETV growth envisaged here will have more than a slight effect on the commercial segment. The audiences for programs can be equated with their popularity and should certain programs on ETV begin to draw viewers in such numbers that commercial stations are affected, there is no reason why the commercial stations could not choose to offer similar programs. It is also possible that certain types of public affairs programs now presented by the commercial segment may decline, since these broadcasters might feel less obligated to fulfill this need. But this would result from actions of the commercial broadcasters themselves rather than from preemption by ETV. In general, though, the total impact of ETV on commercial audience sizes is not likely to be large. Mass audiences are still going to prefer the types of programming offered on commercial channels rather than that offered on ETV. Some persons may alter their present watching habits, but not completely. In addition, viewers may be attracted to ETV who now watch commercial television only infrequently, but this total is not likely to be damaging to commercial television.

Possible Institutional Forms

Another aspect of the development of ETV concerns the various institutional forms which may evolve. The present system of stations is made up of four distinct categories of licenses: community (29 percent), university (34 percent), state (25 percent), and school (12 percent). These figures represent a breakdown of the 140 stations affiliated with NET in March 1968. No mention has been made of the effect this varied control has on the programming offered, because it is felt that in the future the achievement of diversity will not be altered--the only differences will be in the types of programs offered, prompted by the pursuance of community service by these separate interests. The activity of the CPB should result in better defined and more frequent cooperative efforts. The plans for some 39 state networks have already been mentioned, and time will probably see increased cooperation among states on subjects of mutual interest. The FCC report for Fiscal Year 1967 reported that the Eastern Educational Network was the leading educational network and that five others were either operating or organized: Midwest, Western, Rocky Mountain, Central, and Southern Educational Networks. Although these are regional in origin and interest, they can serve as the base for a nationwide network.

Much has been said about the need for ETV to become nationwide so that availability of programming will be maximized. Two separate uses of national interconnection exist: for live, simultaneous broadcast, and for distribution of programs to be used at some later time. There are particular events whose significance merits live broadcast; several such instances in the public affairs field have been financed by the Ford Foundation. From the standpoint of ETV, the use of network interconnection for distribution purposes has more importance. The present one-to-two-week period required for duplication and distribution of programs to stations by NET would be reduced and the timeliness of certain programs would be enhanced. Moreover, the local station could tape for later replay those programs deemed most appropriate. In addition the adoption, in some form, of the proposals which have been made for free transmission of ETV programs from one or more central distribution points to local stations is likely to come about.

Another possibility is that of incorporating portions of ETV operations into the CATV system of presentation. CATV's equipped for program origination could carry NET programs, for example. The carriage of appropriate ETV stations by CATV systems could extend ETV to homes in communities which have CATV but which are too small to support an ETV station. Also, to the extent that CATV reaches homes outside the normal coverage pattern of ETV stations, and this is relatively smaller than the coverage of commercial stations, the availability of alternative programming is increased. It is unlikely that ETV will ever become completely a cable operation until all homes are reached by cable; this has been dismissed as a possibility in the normal development of the industry by 1980. However, the CATV operator is not apt to object to including this extra signal in his service. Therefore, extensive cooperation between CATV and ETV could extend the reach of educational television.

PAY TELEVISION

Another method which has been advanced for creating greater program diversity is pay, or subscription, television, where the costs of programming and other expenses are paid by viewers, rather than by advertisers as is now the case. Efforts toward establishing such a service date back to a 1955 FCC rule, but in the subsequent years very little progress has been made. Only one of three initial test authorizations, Zenith-Teco, in Hartford, Connecticut, has operated and is able to provide operating data and experience. Substantial opposition to pay television exists, both in commercial television and the political arena, and it is likely that further regulatory delays will occur.

At present, the FCC has proposed the establishment of a national pay TV service but has included certain restrictions on its operations which act to protect the established commercial television industry. The restrictions of importance to this study are the limitations placed on the types of programs which can be carried so as to lessen any siphoning from free TV and the limitation requiring the pay TV station to be at least the fifth commercial station in the market. There are about 45 markets that now have one independent station and thus could qualify under the restriction; it was estimated that about 40 percent of the nation's homes are within these markets. There are some 11 markets with at least two independent stations which could be immediately used.

In addition to the regulatory problems, pay TV will encounter economic problems. The costs involved in delivering the pay TV signal are such that in the majority of cases the over-the-air signal is cheaper than cable, if cables are not presently installed. The Zenith-Teco experiment was over-the-air and the requirements they list for viable operations seem to be reasonable. To break even, at least 20,000 subscribers paying $65 a year for programs and

$39 a year for decoder rental are needed. Previous Spindletop studies generally agree with these figures, and it is believed that a pay TV system, as outlined, is economically feasible and has a marginal chance of success. Earlier in this section, it was shown that a fourth network of the conventional type is not feasible, so it can be assumed that pay TV will not affect its formation. Moreover, since carriage by CATV systems is limited to the B Contour of the pay TV station, no substantial effect on the industry will result.

The central question here, though, is the extent to which pay TV increases diversity. One of the restrictions imposed by the FCC is that at least 10 percent of the total programs on pay TV be other than sports and feature films, e.g., educational and cultural programs. This would yield some diversity, but so long as efforts are made to maximize audiences, and in turn revenues, achievement of diversity is lessened. The other 90 percent of the programming, within the limitations proposed by the FCC, is still likely to be similar, but not duplicative, of the current programs offered by the networks. The particular programs offered within a general programming category will be different from that of free TV, and would thus afford more choices to the public; but satisfaction of less than mass appeal tastes are not likely to result. At best, the total possible audience would be limited, less than half the population; and because operations will be confined to large markets they will meet strong competition from other independents as well as the networks. It can be concluded, then, that in the normal development of the industry, pay TV is not apt to become a significant force, nor to greatly increase diversity.

OTHER AUDIO-VISUAL SYSTEMS

Video Record Concept

Recent technological advances have raised the possibility of providing the home viewer with television programs through the use of video tapes or video records that would actually be delivered to the home, and would provide entertainment and information in the same way that phonograph records now provide them. Many video tape systems are now available or under development that would allow a viewer either to record programs from his television set for later replay, or to play prerecorded tapes. The system that appears to be most attractive commercially, however, is the Electronic Video Recording (EVR) being developed by CBS Laboratories. This system, which uses a special 8.75 millimeter unperforated thin film rather than video tape, would allow the viewer to insert a small (7 inches by 1/2-inch) cartridge in a player attached to his television set; the single cartridge would provide a half-hour color program or a one hour black-and-white program.*

Costs

Cost to the home user of video records would have two components--the cost of the player attachment for the television set, and the cost of the video record itself. Throne Industries, Ltd., which will produce the player, estimates the cost at $280. The cost of the record is estimated at between $7 and $14, exclusive of programming cost. Costs for programming will vary considerably, depending on the talent involved and the elaborateness of production. At the high end, costs for an hour of programming could approximate the costs of television programs--$150,000 to $175,000; many programs could be produced for considerably less. The unit cost of programming would vary with sales volume, but could add from less than $1 up to $10 to the cost of a record.

Potential for Achieving Diversity

If a video record industry were to develop, the choices of programs available to viewers might begin to approximate the diversity in phonograph records. Most of the program types suggested for television would be appropriate for video records--plays, operas, ballets, movies, and how-to-do-it records are examples.

Several distribution concepts would be possible for video records. They could be provided on a rental basis, sold directly to the home viewer, or both. Rentals could reduce the cost to the viewer, and might be quite appropriate for topical records, but would obviously reduce the convenience of using the records.

The viability of a video record industry would depend on consumer acceptance of the product. Studies done by Spindletop for a private client developed a model of consumer buying patterns for home recreation items. Using this model,† it is estimated that, at the costs envisaged for video records and players, market penetration will probably not exceed 50 percent and that a lower penetration is quite likely. Even with a 20 percent penetration, a video record industry could be viable, if consumer purchases of video records followed the same pattern as their purchases of phonograph records. Annual phonograph record sales have averaged about 80 percent of the sales volume of playback equipment. At a penetration of 20 percent, a player cost of $280, and an 8-year life, annual record sales would be about $435 million in 1970. Sales of this magnitude could result from each video record household purchasing two records per year, and would generate income sufficient to provide at least 1,000 new record titles annually.

---

*CBS News Release, August 28, 1967.

†Done with the permission of the client.

Video records do, then, have considerable potential for increasing diversity. They would be very good for providing some educational and heavy entertainment programs, since these types of programs could typically bear repeated viewing. Video records, like pay TV, would allow the viewer to pay for programs he wishes to see. With a predicted penetration of less than 50 percent, however, diversity through video records would probably not be available to families with below average incomes. Even with free video records from public libraries, the player cost would be a strong deterrent to purchase and use of video records by lower-income groups.

SUMMARY

Assuming continuation of the present regulatory policies, the prospects for achieving wider diversity of programs are mixed. The growth of conventional UHF stations offers little chance for dramatic increases in the programs now available to the public. Prospects for a fourth commercial network are poor, and for such a network to succeed, it would probably have to offer programs similar to those carried by the present networks.

Prospects for more locally-oriented programming, however, are better. Although there is no apparent trend toward more local programming by existing television stations, two factors give promise of more programming that is of unique interest to a local community. First, program origination by CATV's may expand considerably if the FCC does not discourage such activities. A limited number of CATV's already carry city council and school board meetings, and local sports events; these activities will increase with proper regulatory encouragement. Second, the success of the Muskegon station could lead to similar small, community-oriented stations.

The development of community stations in areas served by big-city stations could be furthered by positive FCC action. Expanding the limit on multiple station ownership could attract considerable resources to these operations and would allow certain economies of scale, although there might be some danger of losing the community orientation of a station like WMKG. Commission regulations concerning transmitter power and service area overlap might also have to be modified to permit development of community stations. These two approaches to community programming may conflict with each other, so they may not be likely to develop simultaneously. Positive FCC action on either one, however, could significantly increase community-oriented programming.

In the next decade, the growth of ETV and the availability of government support for programming will provide a clear alternative to commercial entertainment programs for nearly all the viewers in the country. Furthermore, video records are likely to make available, to a limited portion of the population, a much wider choice of educational and heavy entertainment programs.

Of these developments, video records come closest to providing a mechanism for reaching selective audiences in the same way that publishers now respond to minority tastes. ETV has sought to reach various audiences, and will probably continue to do so, but the decision mechanism in ETV programming does not assure response to minority tastes, and the ability to respond is limited. In commercial television, the requirement for large audiences would lead even a fourth network to provide programs similar to those now available.

SATELLITE-TO-HOME BROADCASTING

System Concept

One of the most glamorous alternatives for distributing television resulting from recent technological advances is direct satellite-to-home broadcasting. This technique has receive considerable exposure in the popular press* where satellite-to-home broadcasting is described as a challenge to the existing communications establishment, and it is implied that such systems could reduce costs drastically. The concept is intriguing, because all markets could be reached simultaneously; line-of-sight, and distance to station would present no problems, and a single channel could provide coverage to the entire country.

---

*Lessing, Lawrence."Cinderella in the Sky." Fortune. October 1967. p. 131.

The basic satellite-to-home concept involves the use of a satellite as a repeater station in space. The satellite would be in synchronous, equatorial orbit. Television signals from a program source on the ground would be beamed to the satellite by a ground transmitter. The satellite would receive the signals and retransmit them to a particular coverage area on the earth--presumably the entire conterminous United States. Any television receiver in the country equipped with the proper antenna and converter could receive the signal transmitted by the satellite, eliminating the need for a local station to receive and broadcast the signal.

System Costs

Direct satellite-to-home broadcasting has two major cost elements--the cost of the satellite system itself, and the costs required to equip a household to receive signals from the satellite. These two costs are interrelated, both depending on the satellite transmitter power. Increasing transmitter power raises the weight of the satellite, so that a more powerful and more expensive launch vehicle is required to put the satellite in orbit. Increased transmitter power, however, would allow reduced household costs. Electrical power sources for the satellite transmitter would likely either be solar cells or nuclear reactors. While it is difficult to forecast technology for the 1975 to 1980 period, nuclear power sources could probably be available if a strong research effort were directed toward this goal.

Table IV-17 shows three possible satellite systems and their costs. Broadcaster costs include those for ground transmitters--both initial investment and operating costs--as well as costs of the satellite. Viewer costs include the costs for an antenna, a preamplifier, a converter, and installation costs. The costs are based on reaching the conterminous United States with a single channel, and assume that 80 percent of the 60 million households in the country are equipped to receive signals from the satellite.

In Table IV-17 broadcasters' costs are indicated by a range. The smaller cost is the expected cost; the larger figure represents a reasonable upper limit. There is an 80 percent probability that the cost will be less than indicated.

The "Total Annual Cost" column in Table IV-17 shows clearly the importance of the viewer costs in the total satellite-to-home system. These costs, which are often omitted from discussions of direct satellite-to-home broadcasting, are by far the largest element of system cost. It appears most unlikely that viewer costs

Table IV-17
Satellite-to-Home Broadcasting Systems
(single channel)

Launch Vehicle	Power Source	Weight (pounds)	Total Electrical Power (kilowatts)	10-year Broadcasters Costs (millions)	Annual Viewer Costs/ Household*	Total Annual Cost at 80% Penetration (millions)
Saturn V	Solar	40,000	35	$418 to $514	$10.40	$542
Titan IIIC	Nuclear	3,650	5	$85 to $190	$13.10	$639
Saturn V	Nuclear	52,000	75	$412 to $580	$10.40	$541

---

*Viewer costs amortized over ten-year period at 8 percent.

Source: Spindletop Research, 1966.

will be below $70 per household in the 1975 to 1980 period. The relative importance of viewer costs makes accurate estimates of satellite costs less important, since even large errors in these estimates have little impact on total costs. Costs would be even greater for a multichannel system--a three-channel system would raise costs at least 10 percent, for example.

Feasibility for Commercial Broadcasting

From the standpoint of a commercial network, satellite-to-home broadcasting could be attractive, since it would not require local stations, and hence would eliminate the network's having to share advertising revenue. The viewer, rather than a local station, bears a very substantial part of the distribution cost, a cost substantially higher than he now pays to receive television programs. The prospects for satellite-to-home broadcasting depend, therefore, on the willingness of viewers to bear this cost.

If all commercial television were distributed in this way, there is little doubt that most viewers would spend the additional money required. If a single additional program source were offered, e.g., a fourth network, considerably less penetration could be expected.* A strong analogy can be drawn between a viewer's willingness to pay for UHF receivers in certain television markets, and the decision to purchase the equipment required to receive a signal directly from a satellite, since in each case the expenditure is made to increase the choice of programs available to the viewer. UHF penetration was examined in five markets with two VHF stations and a single UHF station: Birmingham, Jacksonville, Louisville, Charlotte, and Dayton. In these markets, where UHF capability is required to receive the programs of the third commercial network, UHF penetration averages 70 percent. It can be assumed that at least 30 percent of the households in these markets have purchased television sets since the all-channel receiver law went into effect in 1964, so that some of the UHF households made no conscious decision to pay for UHF receivers. Based on these figures, it appears that direct satellite-to-home broadcasting would achieve a penetration of less than 70 percent of the households in the country if such a system offered an additional commercial network.

---

*Broacasting programs at the same local time in different time zones would require a multichannel satellite, and would raise the costs above those shown in Table IV-17.

Assuming a penetration of slightly less than 70 percent for satellite-to-home broadcasting, a fourth commercial network utilizing such a distribution system would be marginally viable. The advertising revenue for such a network would be proportional to the audiences for its programs. Assuming the network's programs were competitive with those of its rivals, the satellite-to-home network could expect an average audience about two-thirds the size of a conventional network's audience. Total watching would not increase enough to prevent a reduction in each network's audiience (see page IV-65), but the increase in households by 1975 would more than compensate for this. On the other hand, the net revenue per viewer for such a network would be approximately 50 percent higher than for a conventional network, since the sharing of revenues with local stations would be eliminated. At a two-thirds penetration level, therefore, the network's revenue could be expected to approximate that of a conventional network with comparable programming. The network would not, however, have income from owned-and-operated stations as do other networks. Two of the three networks are now profitable without their owned-and-operated stations, and the third is marginal; at a two-thirds penetration, therefore, the network must be marginally profitable.

While commercial satellite-to-home broadcasting might be viable, the problems of achieving sufficient penetration in 1975 are formidable enough to make such an undertaking a risky one. A commercial network would likely lose money until a two-thirds penetration was achieved; thus, the prospect of such losses would probably prevent a profit-seeking enterprise from undertaking such a venture.

Several other aspects of direct satellite-to-home broadcasting should also be noted. Because local stations are bypassed, use of the system would discourage the development of local stations. Distribution of all network television by this method would likely mean the end of conventional local stations in all but the larger markets, since independent stations are on the air in only 45 markets at the present time. Such a system would be very inflexible from the advertiser's standpoint; even some network commercials are now tailored to the specific region in which they are shown, and this would be impossible in satellite-to-home broadcasting. Unlike cable distribution, which also requires a substantial expenditure per household, the system would require use of the frequency spectrum, and there is some question about such broadcasting interfering with other signals.

Feasibility for Public Television

Use of direct satellite-to-home broadcasting for public television has been suggested by those concerned about the inability of ETV stations to carry real-time programming due to lack of interconnection. Satellite-to-home broadcasting is one method by which a substantial portion of the cost of program distribution could be borne by the program viewers. The fact that viewers would bear this expense would, however, severely limit penetration. Studies of the audiences for present-day ETV show that no more than half the population watches ETV, and only about one-quarter of the population watches ETV regularly.* It is unlikely, therefore, that more than one-quarter of the population would pay for the capability to receive public television directly from a satellite. With only one-quarter of the population able to receive its programs, it would be difficult for a network to attract financial resources.

Direct satellite distribution of public television would also have a deleterious effect on local ETV stations. While financial support for these stations is not tied directly to station audiences, the stations do receive substantial support from the contributions of individual viewers in the communities they serve. In 1965, community-supported stations received 18 percent of their revenues through contributions from businesses and subscribers and 21 percent from local government.† If local stations no longer played a role in distributing programs like "French Chef," for example, community support for the stations would probably be much less enthusiastic.

Conclusions

The use of direct satellite-to-home broadcasting seems to offer little possibility for achieving greater television program diversity. The total costs for a single channel system are quite large, approximating the costs for multichannel cable distribution in urban and suburban areas. The system would not eliminate the need for frequency spectrum space. The uncertainty concerning possible penetration and the probable time required to achieve significant penetration make use of the system by a single commercial network unlikely. Even if a network did use direct broadcasting, the analysis in Section III suggests that the network might compete for audiences with programs similar to those now available. Finally, direct satellite-to-home broadcasting would discourage the development of local stations, and would eliminate them in smaller markets where it would replace local stations as distributors of network programs.

---

*See Appendix B.

†Carnegie Commission on Educational Television. op.cit. p. 243.

CABLE DISTRIBUTION

Distribution of television by cable has been proposed by various groups for various reasons. Substituting cable distribution for over-the-air broadcasting would free much of the electromagnetic spectrum for other uses, most notably landmobile radio users. Distribution over a cable with capacity for a large number of channels would provide wider and less expensive access to television audiences than is now possible. Finally, it is claimed that such distribution would increase program diversity by lowering the costs of broadcasting and by making channels available for programs supported by the viewer or the government rather than the advertiser. The following discussion is concerned with examining ways in which the latter claim might be realized and with describing the implications of the wired city on the existing television industry.

Description of Alternative Systems

Several different physical concepts for the wired city have been proposed, differing in details of the system, but similar in that each eliminates over-the-air broadcasting by individual television stations. Coaxial cable would be used to carry the television signal to the home in most wired city schemes, but the use of multipoint microwave systems, lasers, and other systems have been suggested and are being tested. The primary advantage any of these alternatives to cable would offer is reduced cost. Several systems are described in Appendix D. For the purposes of this discussion, it is sufficient to know that alternatives to coaxial cable exist, and that they may reduce the cost of the wired city. In this discussion, then, the term "cable distribution" refers to some optimal combination of these systems that would deliver TV signals to homes without using over-the-air broadcasting.

The costs of television distribution by cable have been estimated at $170 per household if 50 percent of the country were wired.*

---

*See Table D-1.

This cost would be partially offset by reduced cost of the television receiver. Contrary to some sources, however, Spindletop has not found clear-cut evidence that such savings would be significant. Any cable system that is used should be compatible with existing sets if the system is to replace over-the-air broadcasting, which precludes systems such as the rediffusion system that would allow considerable savings on the television receiver.

There are several organizational alternatives for implementing the wired city. Most schemes have assumed that the physical distribution system would be owned and operated by a common carrier, which would lease channel time to all customers, including television stations, networks, politicians, and any other organizations or individuals interested in providing audio-video programs to viewers in the community. The common carrier could be the telephone company, an existing CATV operator, or a new company.

The problems of transition from over-the-air broadcasting to cable distribution are quite substantial and vary with the different organizational alternatives. Discussion in this report will focus on one way in which such a transition might be accomplished--the evolution of CATV's into the wired city.

The economic viability of CATV's is well established. In most areas of the country, the additional signals and better picture quality provided by CATV have induced substantial fractions of potential customers to subscribe to the service. Although CATV began as a service to small-town viewers beyond the reach of more than one or two television stations, it is now entering the larger cities.

The two recent Supreme Court decisions on CATV--FCC jurisdiction and copyright liability--have the potential for greatly accelerating the development of CATV if the FCC is inclined to do so. By affirming the FCC's authority to regulate CATV, the Court made it possible for the FCC to handle many of the issues that would arise in the transition of CATV into the wired city, e.g., whether CATV operators should be required to lease channels to other parties. The affirmation of FCC jurisdiction over CATV, combined with the New York court ruling that CATV's using telephone lines do not require a municipal franchise, are likely to lessen the burden of municipal regulation for CATV operators. The Supreme Court decision on copyright liability, while not removing the possibility that future legislation will impose some copyright liability on CATV operators, does make the position of the CATV industry strong enough to prevent such legislation from crippling the industry.

With favorable regulatory treatment, then, CATV's can be expected to play an increasingly larger role in the distribution of television signals to homes. Furthermore, most aspects of the wired city could be realized very naturally using CATV systems (if FCC policies were designed to accomplish this) even without immediately eliminating over-the-air broadcasting by existing television stations.

A primary feature of the wired city--wide access to television channels--could be provided by the CATV system by leasing channel time to interested organizations or individuals. Since the marginal cost to the CATV operator of leasing a channel is very small, and since CATV operations have proved viable even without channel leasing, use of the CATV system by other parties would allow reductions in the price paid by the subscriber for the service. The additional programming provided on the leased channels, and the reduced prices, would presumably make the service even more attractive to potential subscribers, further increasing CATV penetration.

As CATV penetration increases, an increasing fraction of a local television station's audience will receive the station's signal via cable. At some point, therefore, the television station might have economic incentive to cease its over-the-air broadcasting, denying its signal to that fraction of its audience that are not CATV subscribers. This audience would include both households within the area covered by the CATV system who were nonsubscribers by choice, and the households beyond the CATV area that could not profitably be served by CATV due to the slight population density. An important aspect of the transition to the wired city, therefore, involves the point at which economic incentive exists for a television station to leave the air. This point can be determined by considering the point at which the marginal cost to the station to continue over-the-air broadcasting exceeds the marginal revenue resulting from over-the-air transmission.

A television station's advertising revenue is proportional to the station's audiences; the fraction of a station's revenue due to over-the-air broadcasting is therefore equal to the fraction of the station's audience receiving the signal over the air. If, for example, 25 percent of a station's audience receives the signal over the air, approximately 25 percent of the station's revenue can be attributed to over-the-air broadcasting. The marginal cost for over-the-air broadcasting (which excludes amortization) varies with station size, but is in the range of $50,000 to $100,000. Assuming that the marginal cost is $80,000, Figure IV-4 shows the point at which economic incentive would exist for stations to cease over-the-air broadcasting. For points to the left of the curve, a station's profits would be increased by going off the air. For a station with revenue of $2 million, for example, Figure IV-4 shows that a station would stay on the air until 96 percent of the audience was receiving its signal from cable, thus demonstrating clearly that television stations would have economic incentive to furnish signals to non-CATV subscribers until CATV penetration became very high. Particularly in large markets, where station revenues are greater, the stations' own economic interests would lead them to serve rural audiences. In the 50 largest markets, practically no stations would have incentive to leave the air.

The growth of regulated CATV systems could, therefore, lead naturally to wired cities, in a way that could provide a large number of channels for most households, but that would not deprive the rural population of the service it receives. At some point, broadcasters' self-interest (or frequency spectrum requirements) may dictate the cessation of over-the-air broadcasting. A decision can then be made about whether and how best to serve the rural population, based on the technology then available, because the development of CATV (properly regulated) up to that time will not have foreclosed any alternatives for dealing with the problem.

Evaluation of Wired City

From the standpoint of this study, two questions are of primary importance in the evaluation of the wired city. First, what contribution to program diversity could be made by the wired city? Second, what would be the impact of the wired city on the present and future television industry? While neither of these questions can be answered completely within the time and resources alloted for the study, the following paragraphs attempt to indicate factors that should be considered and possible answers.

Programming--Availability

To determine the potential of the wired city for providing greater diversity of programs, it is useful first to consider the range of programs that could be provided if the requirements for financial support for the programs were not a constraint. Some critics of the wired city have claimed that it would be impossible to provide 20 channels of programming. Consideration of possible programs by the types discussed in Section III and Appendix A shows that the potential of the wired city for diversified programming may be misunderstood.

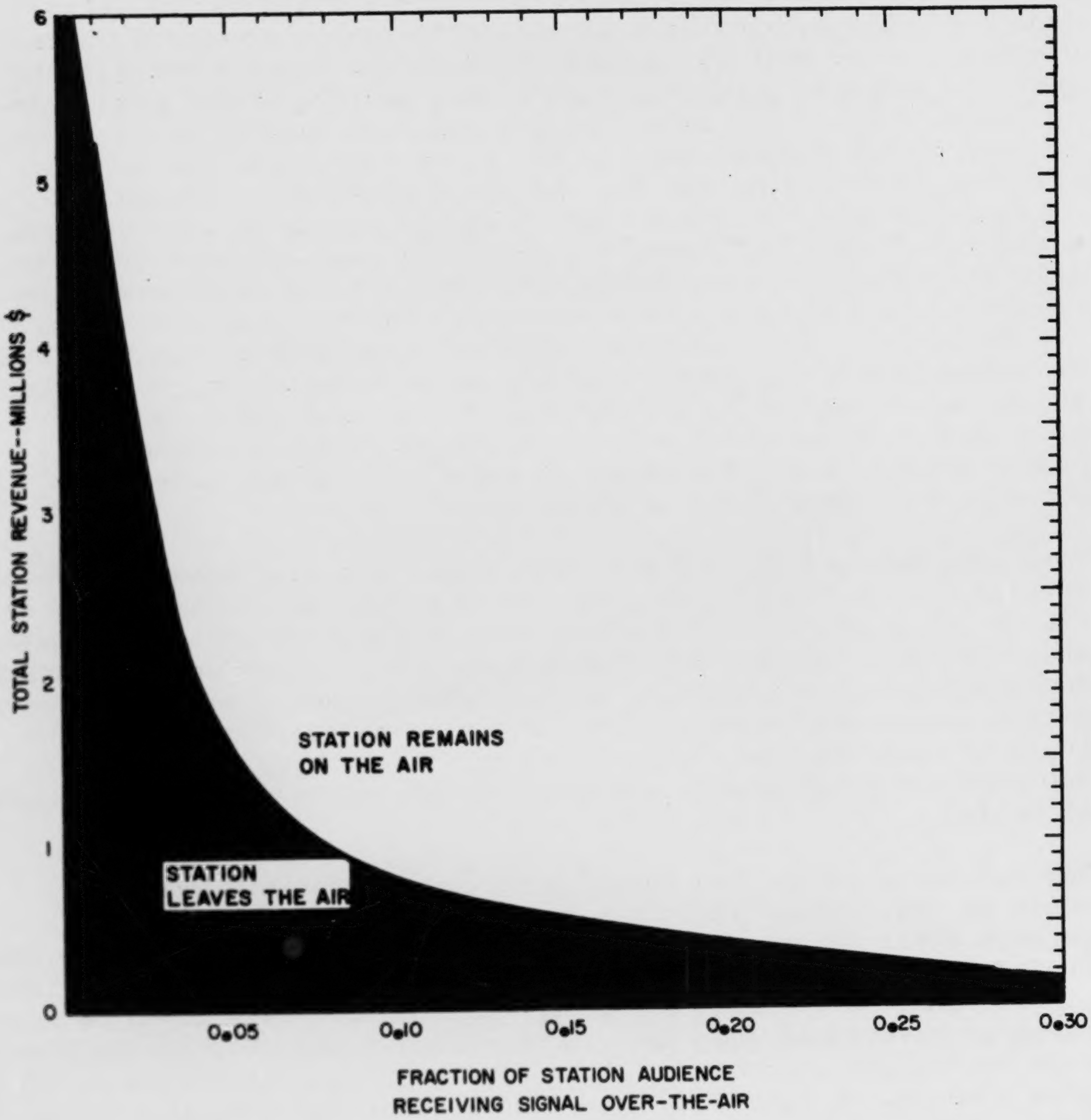


Figure IV-4. Break-even Curve for Over-the-Air Broadcasting

Light entertainment programs make up the bulk of commercial television. The commercial networks claim that a shortage of talent exists even to fill three networks. Such a claim may be valid from the point of view of a network programming executive whose program choices must garner one-third of the total viewing audience; to succeed, network programs must achieve better than average penetration. The fact that the audience must be split three ways virtually assures that in any given time slot, one program will not be achieving the desired share-of-market. Indeed, if ratings were not a concern, the 28 weekly series in last September's network program schedules that have been dropped* from the 1968 fall schedule would constitute one-half the prime time programming required by a fourth network. Further evidence of the availability of entertainment talent is suggested by the high rate of unemployment--31 percent--in the movie industry which is cited in support of pay TV.† Foreign television programs could also provide a rich source of additional entertainment programming. Sports events, especially ones of local or regional interest, could provide many hours of programs.

Potential sources for heavy entertainment are even greater. These sources can be tapped simply by taking advantage of current activity in the performing arts. One study has estimated, for example, that the major and metropolitan symphony orchestras in the country could provide 2,900 hours of programming; broadway and off-broadway plays, summer and other professional theatre could provide 3,000 hours of programming; professional opera companies could provide 350 hours of programming; and dance groups could provide 425 hours of ballet.‡

Educational programs, in addition to those presently available, could be provided by individuals and groups that presently must perform their functions without the use of television. Continuing professional education could be provided, for instance, by various professional societies. Consumer education programs could be produced by government agencies. Documentaries and programs to provide background information and analysis of current events could draw some talent away from other media. For example, this could happen if a "magazine of the air" were initiated.

---

*TV Guide. June 15-21, 1968. p. 32.

†Remarks by Senator George Murphy in the Congressional Record. May 2, 1968.

‡Tullman, M. Economics Working Paper 6861. Washington University. June 1968.

The possibilities for programs intended to provide information are tremendous. News programs could be continuously updated. Real-time coverage of current events--ranging from United Nations, United States Senate, or city council sessions to a stock ticker tape--could provide many hours of programming. Government agencies could provide information about their programs.

Political programs and discussions of local issues could take place on television, especially if the cable system were designed so that access to individual communities would be possible. Provision for studios in each community with access only to that community would also allow a wide variety of locally produced nonprofessional programs.

In addition to all of the above program sources, the possibility of repeating programs at insignificant marginal cost to obtain time diversity could greatly expand program supply. There can be little doubt, therefore, that resources exist to fill 20 television channels with program material.

The availability of channels in the wired city would make possible an increase in the number of television "stations," similar in nature to the present stations. The possibility must be considered, therefore, that as the number of stations increases, some stations will seek to provide types of programming not available on commercial television.

Programming--Financial Support

The fact that adequate talent and program sources are available to fill 20 television channels with diverse programming does not necessarily imply that such diverse programming will come about. The numbers and types of programs will depend on the resources available and committed for their support. To determine the extent to which the wired city might increase program diversity, therefore, it is first necessary to consider sources of financial support for programming, and the types of organizations that might make programs available. At least three major sources of support need to be considered--advertising, the viewer, and the government. In addition to these, various special groups--businesses, professional associations, community clubs--might provide programs.

Advertiser Support

Advertising sponsorship for programs depends on the size of audiences reached by the programs. The analysis described in Section

III pointed out that a broadcaster seeking to maximize audience size may duplicate program types already offered rather than provide a different program type. The decision to do this depends on the relative audience sizes for different program types. In order to understand the possibilities for commercial stations providing more diversified programming, therefore, it is necessary to consider the audiences for different types of programming.

Appendix B estimates audiences for various types of programs, based on experience with ETV programs, commercial programs, and pay TV. Audiences in 1980 for programs other than those presently available on commercial television are estimated at only 2.4 percent of the population, assuming that individuals do not substitute television for other media, e.g., newspapers and magazines. Since prime-time commercial programs of the three networks typically attract between 50 and 60 percent of the population, it is apparent that a new broadcaster seeking to reach the largest possible audience will provide programs similar to those of the existing commercial network rather than different types of programs.

If new broadcasters seek to maximize profits, then, even the 20 channels provided by the wired city will not guarantee much diversity in advertiser supported programming. On the other hand, few organizations or individuals pursue strict profit maximization goals; a satisfactory level of profit is generally sought. For this reason, it is important to consider the costs and potential advertising revenues for different types of programs to determine which, if any, might be supported by advertising.

From the standpoint of advertisers, a program has value in direct proportion to the number of people (or households) viewing the program. The best measure of this value is probably indicated by national and regional spot advertising. For a one minute commercial in prime time, a spot advertiser pays about $2.60* for each 1,000 homes viewing the station on which his commercial is shown. During the day, this CPM rate varies from $1.75 to $2.75, averaging about $2.25. Fifteen percent of this amount is typically paid to the sales representative. A program that reached 2 percent of the population, then, could be expected to generate (after commission) about $2,300 for a one minute commercial. Network CPM's are about $3.40 for prime time, and about $1.50 for daytime television (after commission).

Broadcasting. November 20, 1967. p. 39.

Although CPM's have been increasing through time, there may be a tendency on the part of advertisers to exaggerate the increase. It is difficult to find evidence that advertising rates per viewer are increasing any faster than other costs in television. Advertising is a relatively constant fraction of gross national product (GNP) and increases in direct proportion to GNP. Television advertising has increased rapidly by capturing an increasing share of total advertising expenditures (see Table IV-18). Television's ability to do this has been due to an increasing advertiser perception of the effectiveness of TV advertising, and to increasing television audiences. In fact, when television audiences are considered, advertising rates have not risen rapidly, as Table IV-19 shows.

Table IV-19
Television Advertising Costs

		Network		National and Regional	
	Index of Television Usage	TV Time Cost Index	Index of Cost per Million Hours of Usage	TV Time Cost Index	Index of Cost per Million Hours of Usage
1960	100	100	100	100	100
1961	104	103	99	105	101
1962	108	106	98	108	100
1963	112	110	98	115	103
1964	120	114	95	123	102
1965	125	119	94	130	103
1966	128	122	95	137	107

Source: Printers' Ink. January 27, 1967. p. 12.

Advertiser Support for ETV-type Programs

Costs for programming depend partly on the producing organization and its scale of operation. The most efficient method for producing a full schedule of programs would be a central organization like the present National Educational Television network, since production economies of scale can be realized and distribution of programs throughout the country can reduce the program cost per viewer. It is useful to examine the operations of an NET-like organization in a wired city environment. Suppose that such an

Table IV-18
Advertising Expenditures

Media	1935	1940	1945	1950	1955	1960	1961	1962	1963	1964	1965	1966	1967
Television Percentage of Total	--	--	--	3.0%	11.1	13.3	13.6	15.3	15.5	16.2	16.5	16.7	17.4
Radio Percentage of Total	6.7%	N/A		10.6	5.9	5.8	5.9	5.9	6.0	6.0	6.0	6.1	6.1
Newspapers Percentage of Total	45.1%			36.3	33.6	31.0	30.6	29.7	29.0	29.3	29.2	29.5	29.1
Magazines Percentage of Total	8.0%			9.0	7.9	7.9	7.8	7.9	7.9	7.8	7.9	7.8	7.6
Other	40.2%			41.1	41.5	42.0	42.1	41.2	41.6	40.7	40.4	39.9	39.8
Total Advertising Expenditures (millions)	$1690	2088	2875	5710	9194	11,932	11,845	12,381	13,107	14,155	15,255	16,670	16,844
GNP (billions)	$ 72.2	99.7	211.9	284.8	398.0	503.7	521.2	560.3	590.5	631.7	681.2	739.6	785.0
Advertising Percentage of GNP	2.3%	2.1	1.4	2.0	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.1

organization provided 10 hours of programming each week to a local cable distribution center. In Appendix B, average audiences for "diversified" programming of the sort provided by NET are estimated at about 2 percent of the population in the latter half of the next decade. If the wired city included 80 percent of the 70 million households in the 1978 population, then 1,120,000 homes would watch an average program. Using the present network CPM, a one minute commercial would be worth about $3,800 to an advertiser. If each hour of programming carried six minutes of commercials, then 10 hours of programs would generate $228,000 of revenue each week. If the 10 hours of programming were repeated, average audiences might average two-thirds of the original audiences,* generating another $152,000 of revenue each week, for a total of $380,000 per week, or about $15 million over a 40-week television season. NET presently provides 10 hours of programming each week to its affiliated stations; total NET expenses in 1967 were $8.2 million.†

These rough calculations suggest the possibility of commercial support for certain kinds of heavy entertainment, education, and information. No account has been taken either of increases in programming cost or of increases in advertising CPM's. If the network sold advertising time, sales expense would increase the network's total operating cost; selling expense was about 6.4 percent of total revenue for all commercial television in 1966. On the other hand, no allowance has been made for the possibility of advertisers' paying a substantial premium for the higher income, better-educated individuals who typically comprise the audience for such programs.‡

Advertiser Support for Community Programs

Advertising support for a series of community-oriented programs--local sports events, discussions of local issues, etc.--in the wired city should be adequate to make programs of this type viable. WMKG in Muskegon, Michigan,§ has demonstrated the viability of such an operation even with the expense of over-the-air broadcasting. Use of a cable, if only the marginal cost of distributing such programs is considered, could make such programming profitable.

---

*See Appendix H.

†NET, A Progress Report 1967-68.

‡See Appendix B.

§See the discussion of local programming in commercial television, page IV-22

Viewer Support

The wired city would make viewer support of programs quite feasible. The possibilities for pay TV are so numerous, in fact, that regulatory action would probably determine the type of pay TV system that would come about in the wired city. With the costs of cable installation shared among many users, the primary pay TV cost would be for the decoder attachment at the home (if programs are paid for on a per program basis) or for a filter (if a flat rate is charged), which would reduce considerably the cost per household compared to an over-the-air system. Including collection, annual costs per household are estimated at $22 for a decoder and $11 for a filter; this compares with a $54 cost per household for an over-the-air system. It is quite conceivable, for example, that a national pay TV network could come about, with billing either on a per program basis or a flat monthly charge. Because of the economies of scale in programming and the national coverage possible, a very small penetration could generate adequate revenue to support programming--even a 1 percent penetration could cover the costs of an elaborate television special if each viewing household paid only 50 cents.

A system in which a flat monthly rate was charged for a substantial number of different programs could be the most attractive alternative for a pay TV network. The pay TV experiments have shown that "box-office" attractions are necessary to achieve high penetration, since viewers will not pay for programs that are available at no charge on commercial television. By showing such programs periodically, a large fraction of viewers may be encouraged to subscribe. In the Hartford experiment, for instance, 76 percent of the subscribers paid $3 to watch the Liston-Patterson championship fight. If pay TV by wire were available to 80 percent of the TV households in the country, and 35 percent of these households could be induced to pay $3 for such an attraction once every two months, enough revenue would be generated to support a full-scale network operation.

A flat fee arrangement could, in fact, provide the mechanism for overcoming several of the problems in the structure of television described in Section III that can result in lack of diversity in the program types offered to viewers. The analysis of the problem in that section pointed out that if broadcasters seek maximum audiences, there is no guarantee that any viewer will be offered his first choice of program. The program types offered will be those that are acceptable to the largest number of viewers, since the individual viewer has no way of making a differential response--he can only watch or not watch. With flat fee pay TV, however, the broadcaster's best strategy to achieve large audiences may be to offer some minimal number of each program type that is the type most desired by any viewer in order to entice him to pay the flat fee.

Payment on a flat fee basis would not be as responsive to the intensity of viewer's preferences for various programs as per program charges, but even the flat fee system could respond by varying the mix of programs. The "cost per hour of favorite program type" would therefore vary from viewer to viewer. For example, if the fee were $4 per time period, and two ballet programs were shown during the period, all viewers to whom ballet was worth $2 per program would subscribe. By increasing the number of ballet programs to three per time period, the cost per ballet would fall to $1.33, therefore attracting additional viewers to whom ballet was worth more than $1.33 but less than $2. The broadcaster, by providing different amounts of various types of programs, would give the subscriber a chance to make a differential response.

Caution must be exercised, however, when estimating the total amount of money available for pay TV. Appendix E shows that the fraction of recreation expenditures spent on five categories of recreation--those that involve listening or watching, rather than participating--has drifted slightly downward in the last 20 years, in spite of the tremendous increase in expenditures on television during that time. The increase in expenditures on television came largely at the expense of admissions to motion pictures. Since expenditures for pay TV would also tend to be substituted for movies, the amount of money likely to be available is limited. Total expenditures for all movie admissions in 1965 were less than a billion dollars, and it is unlikely that more than half that amount would be available for pay TV.

Support from Special Groups

The Ford Foundation has been the major source of support for ETV programming for many years. Such support is likely to continue. If other sources of support are found for ETV, however, then foundations will probably support specific programming efforts, in the way the Ford Foundation has sponsored the Public Broadcasting Laboratory.

With access to television channels readily available, many different organizations and individuals could produce programs and lease broadcast time, either directly from the cable owner or through a "wholesaler" of channel time. If minimal facilities were used, the hourly cost of such time need not be great. Although a standard television studio equipped for color requires an equipment investment of over $600,000, a minimal CATV-type studio can be equipped for $34,000. (See Appendix F for cost details.) Such a studio would be adequate for many potential uses of television, e.g., political speeches and discussions of local issues. Depending on labor costs and the utilization rate for the studio, channel time might be sold for as little as $25 per hour.

Governmental Support

Governmental support is most appropriate and most needed for programs that could have wide benefit, but which will not be supported in other ways.* The heavy entertainment and educational programs of ETV may be such programs, although it does appear that such programs could be supported by other means in the wired city. The best approach for a government sponsor like the Corporation for Public Broadcasting would probably be to invest in relatively few, high-quality programs of general interest appropriate for repeated showings, as suggested by Newton Minow.†

Aside from this, support from the various levels of government would probably be most needed for information programs. Various government agencies at the local, state, and national level could use the medium to communicate information about their programs. The costs connected with such use could presumably be borne by the agency as a normal operating expense.

Impact of the Wired City

Local Television Stations

The wired city could affect the present local television stations in at least two important ways: First, by affecting their sources of programming, especially their relations with the networks; and second, by bringing about increased competition for viewers.

---

*Baumol, W. and Bowen, W. The Performing Arts--The Economic Dilemma. Chapter XVI. New York: The Twentieth Century Fund. 1966.

†Minow, Newton, "Must Tedium be the Message." Playboy. June 1968, p. 117.

Local Station Role in Distributing Network Programs

An examination of the impact on local stations must begin by assuming either that local stations will or will not continue to play a role in the distribution of network programs. If local stations ceased to distribute network programs and no longer received advertising revenue from advertising time sold on and around network programs, then most commercial stations would either go out of business or would radically alter and reduce their operations. If these stations no longer carried network programs, they would not only lose the substantial portion of their revenues that comes from their share of network advertising (See Table IV-20); they would also lose their most important source of programming. Network affiliated stations carried an average of 78 hours per week of network programming, or about 65 percent of their total program schedule.* In addition to network revenue, these programs provide an audience for the station to sell to national and regional advertisers, and to local advertisers. Since most stations carry network programs in prime time, these programs probably account for considerably more than 65 percent of the stations' audiences. At a minimum, loss of network programs would reduce station revenues by 50 percent. Accompanying this reduction in revenue would be very little reduction in cost; Table IV-20 shows, therefore, that with this loss of revenue even the largest, most profitable stations would suffer losses. If the stations lost their network affiliation, of course, they could attempt to operate as independent stations. While a few of the larger markets might be able to support one additional independent station in addition to three networks and the existing independent stations, most stations could not be operated profitably as independents. The local programming done by these stations would therefore cease.

The dependency of television stations on their network affiliations could make them very vulnerable in the wired city. The share of network revenues that stations receive from the network are a matter of negotiation between the networks and the stations. The stations now negotiate from a position of substantial strength, because the number of stations in each market is limited, and networks must have affiliates to distribute their programs to the viewers. If in the wired city there were no substantial regulatory and financial barriers to entering broadcasting, competition for network affiliations could become quite fierce, and the networks could

---

*Based on Spindletop sample of FCC license renewal applications.

Table IV-20
Broadcasting Revenues and Profits

	Size of Market (population)				
	Less than 100,000	100,000 to 250,000	250,000 to 500,000	500,000 to 1,000,000	over 1,000,000
Network*	31.3%	26.8%	26.0%	22.7%	16.4%
National and regional*	31.1%	34.6%	40.8%	48.6%	60.6%
Local*	37.6%	38.6%	33.2%	28.7%	23.0%
Gross profit for median station	12.5%	17.9%	21.2%	27.5%	40.6%

---

*Percentage of advertising revenue for median station.

Source: Television Financial Report. National Association of Broadcasters. 1967.

negotiate contracts that would allow them to retain greater proportions of their revenue than they do now. Network affiliation would go to the low bidder. In the absence of regulatory pressure to provide other programming, the low bidder could not afford to provide any programs that did not yield a profit, including most local programming.

Competition from New Independent Stations

If local stations retained their network affiliations under the same arrangements as exist today, they still could face increased competition for viewing audiences. Competition could come either from stations offering programming similar to those of commercial television or from types of programs that are not available today. It is unlikely that programs of the latter type would attract enough viewers away from commercial television to affect commercial stations significantly. ETV stations have had little impact on commercial television stations, because their audiences are small.

Even with a multiplicity of heavy entertainment, educational, and information programs available in the wired city, it is unlikely that such programs would significantly reduce audiences for commercial programs; audiences for such programs are estimated at less than 3 percent of the viewing audience (See Appendix B).

Competition that could result from additional commercial stations in the wired city are a far more serious threat to present television stations. The amount of time people allocate to commercial television viewing appears to be only loosely connected with the number of program choices available, particularly for choices in addition to the three network programs. For example, television watching (defined as viewing time/household) in a sample of 26 markets in which new stations went on the air increased by 18 percent; watching in markets in which no new stations went on the air increased 10 percent in a comparable period of time, implying that the addition of a program choice increased television watching by only 8 percent. For 2-station markets that gained a third station, however, watching increased 32 percent of which 22 percent could be attributed to the entry of the third station.* Even when the additional program choice is a network program, therefore, a significant fraction of the audience for the new program comes from the audiences of the other two programs. When the additional program choice is not a network program, the audience for the program comes almost totally from the audiences of the other commercial programs.

If the audience for commercial programs is relatively fixed in size, then the degree to which existing stations will lose audience depends on the number of new stations competing for audiences, and the size of audiences that they may attract. A sample of 18 independent stations in seven markets shows that in prime time, the average independent station captured 4.1 percent of the television audience, compared with 29.3 percent for network affiliates.† Even making allowance for the poorer coverage of the independent stations, it is clear that in competing for audiences with network affiliates, independent stations are at a disadvantage that will not be eliminated by the wired city. For this reason, it is highly improbable that any existing network affiliates are likely to be driven out of business by independent stations entering the market. As additional stations enter the market, and the existing stations lose audience (and therefore revenue), they can be expected to reduce costs.

---

*Expected Changes in Television. Lexington, Ky.: Spindletop Research. July 1966. p. 8.

†Based on January-February 1968 ARB ratings.

The most obvious way for such stations to reduce costs is to cut back on local programming, since costs associated with such programs exceed the revenues they generate. The extent to which stations reduce their operations will depend, therefore, on the success of independent stations. If each independent station were to attract 8 percent of the viewing audience (instead of the 4.1 percent for stations in the sample, to allow for better coverage), then in a 3-station market each network affiliate would lose an average of 2.7 percent. Since the average share of audience for network affiliates presently ranges between 25 percent and 33 percent (depending on the number of independent stations in the market), a loss of 2.7 percent of the total viewing audience would amount to a 10 percent reduction in the station's audience. Assuming that station revenues would decline in the same amount, then, each independent station entering a market might cause a reduction in station revenues of about 10 percent. The gross profit figures in Table IV-20 show that a 10 percent reduction in revenues would have placed the median station in the smallest market group at about the break-even point, and would have left the median stations in the other groups operating at gross profits ranging from 7.9 percent to 30.6 percent of broadcast revenue. The addition of one independent station, averaging 8 percent of audience, would not, therefore, have spelled financial disaster for the typical local television station in 1966, and it can be assumed that this will be true in the future.

The addition of a second station, again achieving an 8 percent share-of-audience, would have more serious implications for the smaller stations. A further 10 percent reduction in revenue would cause the median stations in the two groups of small stations to operate at a loss, and the median in the next group to break even. The financial prospects for an additional station in the smaller markets would not be good, however, and it is unlikely that they would come about. Only four markets in the top 100 actually have all authorized channels on the air, which suggests that under present conditions, market factors are a constraint on the development of new stations in these markets. The availability of cable in the wired city probably would not reduce costs for an independent station by more than $100,000. Cost savings of this magnitude are not likely to make two additional independent stations viable in a market where at present the viability of a single additional station is questionable.

Competition from New Networks

The preceding discussion has assumed that the additional stations competing with the present stations for audience would be independent stations. Under this assumption, competition from additional stations would reduce station profits, but they are not likely to seriously damage existing stations. If television were distributed by cable, however, the possibilities for additional networks could be very real. The discussion of the possibility of a fourth network in the earlier section on the "normal" development of the television industry pointed out that one serious problem for a new network is obtaining affiliates; this problem would be eliminated by the wired city. The advantages to networks of cable distribution were pointed out at the beginning of this section--the existence of alternative stations for affiliation would (in the absence of regulatory constraints) allow the networks to drive down the fraction of revenue given to the local stations. The wired city could, therefore, allow a fourth network access to most of the homes in the nation, and at the same time make it considerably cheaper to reach these homes. Signficantly reducing the $80 million that the average network pays* to local affiliates could make a fourth network viable in the near future.

Stations affiliated with a fourth network could present serious competition for the present television stations. A national (or regional) network could offer a coordinated, and nationally publicized, schedule of programs. If a new network were able to capture 20 percent of the audience, then network affiliates in 3-station markets would have their average share-of-audience drop from 33 percent to 27 percent, a reduction of over 18 percent. An 18 percent reduction in station revenues would have serious implications for existing stations. It would make most small stations unprofitable, and would reduce the profits of the larger stations enough to discourage their local programming activities.

Other Competition

A further threat to existing local stations in the wired city could come from the growth of unconventional community stations like station WKMG, which provide low budget discussions of local issues, but do not have full-time news and public affairs staffs. From some of its programs, WKMG has attained a 30 percent market share in its community. At its present scale of operations, however, this station is not likely to affect the three network affiliates in its market. Its revenues are averaging about $13,000 per month, while total revenues for the network affiliates in the Grand Rapids-Kalamazoo market averaged $740,000 per month in 1966. Thus, several community stations in the market could duplicate WKMG's performance without having greater impact than one conventional independent station. Community stations are probably more likely to develop in the heavily populated communities around large cities, and the television stations in these cities are the most profitable ones in the industry. If community stations do develop extensively, the present stations serving these communities may reduce their coverage of community events.

---

*TV Broadcast Financial Data--1966. Federal Communications Commission.

Commercial Networks

One of the most critical issues in determining the impact of the wired city on the existing network is the financial arrangements that would exist between a network and its affiliated stations. If access to the cable is sold on the same terms to all customers, and if the networks are free to negotiate affiliation arrangements with any station, then the networks will be able to decrease significantly the fraction of revenues paid to the local affiliates. In 1966, the three networks paid $201 million* to affiliated stations (excluding their owned-and-operated stations). With unlimited access to the cable, the cost at the distribution center of feeding the network signal to the cable would be relatively minor; even if networks paid an average of $100,000 per market to reach 200 markets, total network payments would be $60 million, a savings of $140 million. In 1967, the networks earned $56 million (before taxes), so this cost savings would increase network profits two and one-half times.

On the other hand, the wired city would encourage development of additional networks, both by the cost savings it would make possible, and by breaking the existing networks' near monopoly on access to viewers through local affiliates. If competition were not restricted, then, it is likely that additional networks would develop. If the audiences for commercial television programs are at (or near) an upper limit, then the amount of money available for television advertising is also limited (ignoring for the moment the growth of advertising as a result of expanding GNP and advertiser perception of increased effectiveness of TV advertising compared to other media). The increased competition from an additional network would therefore reduce revenues for existing networks, just as new network affiliates would reduce revenues for existing local stations. To compete with the existing networks, new networks would probably have to present programs of commercial quality. To minimize their costs, they could be expected to present only those programs which were likely to yield a profit, so a new network's public affairs and news programming would be minimal. As existing networks lost revenue, pressure would exist for them to cut costs, which might force them to cut back their current events and public affairs coverage (as ABC is alleged to be planning). In a competitive environment, then, the net result is likely to be a reduction in commercial programming of this type. These pressures might be alleviated by the natural growth of television advertising revenue, but in a competitive situation, most programs that did not at least recover their costs would be eliminated.

---

*TV Broadcast Financial Data--1966. Federal Communications Commission.

Program Costs and Advertising Revenue

The increased competition in the television industry described in the preceding paragraphs could affect both the costs of producing television programs and the advertising revenue they generate. These two factors are interrelated. Because of the restricted supply of television advertising opportunities, some broadcasters may be earning monopoly profits now. (Table IV-20 shows that the largest stations, which are in markets where the supply of television advertising time per consumer is lowest, earn the greatest gross profits.) If this is the case, increasing the supply of advertising time by the increased competition that would exist in the wired city would tend to force down the price of advertising time. This would, of course, benefit the advertiser. Even if advertising rates were reduced, however, the total amount spent on television advertising could still be expected to remain the same or to increase if the marginal effectiveness of advertising is reasonably constant. Furthermore, there is reason to believe that advertisers might drive up rates to their previous levels. If it can be assumed that the allocation of advertising dollars among various media by an advertiser is done rationally, e.g., that the marginal effectiveness of the advertising in all media is equal, then a reduction in advertising rates would require shifting money from other media to television. This shifting would continue until the marginal effectiveness of advertising in all media was again equal, which presumably would occur when advertisers had bid up advertising rates to near their previous levels.* If this occurred, then total advertising would be increased only to the extent that the increased supply of programs to the viewer increased the total audience for television.

If the total amount of television advertising revenues remained constant (or expanded less than did the supply of programs), the amount of money available per program would decrease. What would be the impact of this on program costs? To determine this, some discussion of the nature of program costs is necessary. Two types of costs are distinguished in program production: "below the line" and "above the line." Below-the-line costs relate to services available from within the specific production organization, and generally involve the mechanics of program production; they include such items as studio rental, scenery construction, wardrobe service, equipment, stagehands, etc. Above-the-line costs are those involved in the actual acquisition of program material, including writers, directors, travel expenses, talent, etc. The prospects for cost reduction differ for above-the-line and below-the-line costs. Below-the-line costs, in absence of increased competition, are expected to increase 30 percent over the next 10 years.† This increase would occur even though equipment costs are falling because of increased color programming, and a tendency for price reductions simply to cause production facilities to be upgraded. The strength of labor unions in the television industry makes it unlikely that the labor component of below-the-line costs can be cut significantly, although some movie and television producers have restored to foreign production to cut these costs.‡ Heavy pressure to reduce costs could encourage the use of lower cost equipment. For many commercial productions, however, the labor costs are a greater portion of below-the-line costs than are equipment costs (See Table F-1), so the possibilities for reducing below-the-line costs are limited.

---

*In classical economic terms, both the supply and demand curves would shift to the right. The supply curve would shift as new suppliers entered the industry, and the advertiser's demand curve would shift as the relative costs of advertising in the various media changed in favor of television.

†Costs for Producing Television Programs. Richard Heffner Associates, Inc., May 1968.

‡This "runaway" production is being fought by the unions. See Broadcasting. April 8, 1968. p. 10.

Above-the-line costs generally reflect the "star system" that characterizes the entire entertainment industry. Pressure to reduce costs could severaly test this system. The presently limited number of programs makes it difficult to assess the "marginal revenue product" of television entertainers; e.g., Is the "Tonight Show" popular because Johnny Carson is featured, or is Johnny Carson popular because he is featured on the "Tonight Show?" The effect of increased competition and its attendant cost reduction pressures would be to answer this question. Those performers who were able to maintain their audiences in the face of increased competition would still be worth the large sums of money they are now paid. Those whose audiences fell, i.e., those whose "popularity" was based on the limited number of choices available to viewers rather than an inherent appeal, would suffer cuts in compensation. The net effect of increased competition would probably be to reduce talent compensation and above-the-line costs.

Other Considerations

In the wired city, the present ETV stations could be subject to the same pressures they would be subjected to in satellite-to-home broadcasting. They would no longer be required in the distribution of NET programs; and since a considerable amount of their support probably comes because of the role they play in distributing these programs, they could suffer serious financial consequences if they were eliminated from the distribution of national programs. The availability of high-quality ETV programs could also discourage local program production, especially among the smaller stations.

The wired city could have implications in a wide variety of ways that are beyond the scope of this study. The increased use of television compared to other media that could result may or may not be desirable. The ready availability of first-rate professionals in the performing arts could discourage the development of lesser professional talent, although it might encourage amateurism in the performing arts.*

Summary

This discussion of cable distribution of television has attempted to present some of the major issues raised by the wired city, and to give some possible answers to those questions. One institutional alternative for bringing about the wired city was discussed--the growth of CATV in an actively favorable regulatory environment. Recent regulatory developments have cleared the way for the logical evolution from CATV to the wired city. This alternative is not proposed as the only or best way to create the wired city; the possibilities of this alternative were explored as a result of a division of labor agreement with the Task Force staff.

---

*Baumol and Bowen, op.cit., p. 407.

One of the primary questions addressed in this study concerns the probability of achieving greater program diversity in the wired city. The conclusion of the study is that adequate programming resources exist to make use of a large number of (e.g., 20) television channels, and that support would exist for most types of programs discussed in Section III. Advertising could even support a network providing heavy entertainment and educational programs similar to those of present ETV, although such support would require some mechanism for assuring that audience maximization was not sought by the network, e.g., by making the network a not-for-profit organization.

Pay TV has the potential for avoiding some of the characteristics of the present industry structure that restrict diversity of program content. Commercially supported community stations would probably also develop.

The implications of the wired city for the existing television industry are quite substantial. A central issue relates to the relations between networks and their affiliated stations, and the networks' access to the wired city. This is partly an issue of how much, and in what manner, to assess the commercial networks for access to viewers via cable. If networks (or their affiliates) are allowed to pay the same time charges as all other users, excluding existing local stations, then local stations in their present form would probably cease to be viable in all but the largest markets. (In the one institutional alternative described in the study--the evolution of CATV into the wired city--networks would not necessarily have access directly to the cable.) Even if existing stations maintain their network afffiliations (and the associated revenues), the possibilities of additional networks (free or subscription) plus the likelihood of the growth of small, community stations, will put pressures on these stations that will tend to reduce or eliminate most of their present local programming. Similarly, if ETV stations are eliminated in the distribution of national programs, e.g., NET programs, these stations could be in economic jeopardy. As a result, local programming of ETV stations might be lost.

If networks have direct access to viewers through the cable, prospects are good for the development of additional networks. Increased competition at the network level and its attendant increase in the supply of advertising time will not necessarily reduce advertising rates, but could force reductions in program costs. It is not likely that pressures to reduce cost would cause significant reductions in program quality, although some less expensive equipment might be used, and the prices paid for some talent would probably fall.

100

Appendix A

Uses of the Television Medium

INTRODUCTION

Section III of this report identifies some possible uses of the television medium. The categories of use identified there are discussed in this Appendix.

ENTERTAINMENT

The function best served by television today is that of providing low-cost entertainment and diversion to a large fraction of the population. There is no reason to believe that this will change, or that it should change. Within the broad category of entertainment, however, a wide variety of programs is possible, ranging from light entertainment to "serious" drama, classical music, and ballet. Sports events are also an important type of entertainment.

EDUCATION

Since this study is concerned with television programs for household consumption, use of TV for classroom instruction is not considered here. Beyond formal classroom instruction, several different areas can be distinguished. Education relating to vocational training could cover specific skills and information, or could provide general background information for professional use. Beyond specific vocational programs, educational television could be aimed at helping people live more effectively; programs of this type could range from shopping hints for consumers to medical information, "how-to" programs, and marriage counseling. A third major category of programs could be aimed at increasing the viewers' understanding of the world, including himself. These programs would provide background information and interpretive comment of the sort provided in present-day television documentaries, both commercial and noncommercial. Also included in this category might be drama and other art forms that contribute to our understanding of the world and ourselves.

INFORMATION

Programs of an informational nature have provided some of commercial television's most favorably received programs. The capability of the medium to provide information quickly--on a real-time basis in some cases--far exceeds that of any other visual media. If certain types of educational programs can be thought of as providing background information, then information programs can be considered continually to update the viewer's knowledge about the world. Although many of commercial television's most critically successful programs have been of an informational nature, the possibilities for this sort of program have hardly begun to be tapped, particularly in the area of real-time coverage of current events.

SOCIETAL REQUIREMENTS

Apart from individual needs, certain functions required for an orderly operation of society could be accomplished by television. Legal control--for instance, income tax compliance, as suggested by Schwartz and Skolnick*--could be pursued on television. In addition to providing information, televised discussion of local issues could promote community cohesiveness. Political broadcasts could also contribute to society's efforts to govern itself.

PROGRAM ORIGINATOR BENEFITS

While most discussions of the benefits of television focus on the viewer, the potential for fulfilling needs of those who originate programs should not be overlooked. Specifically, television could provide significant opportunities for self-expression for those involved in the creation of programs, so benefits could be claimed for any increase in the opportunity for individuals to participate in television program production.

These uses of the medium suggest the types of programs identified in Section III.

- Entertainment
    - Light entertainment--including most present-day commercial fare
    - Heavy entertainment--classical music, "serious" drama, ballet
    - Sports

---

* Schwartz, R. D. and Skolnick, J. H. "Televised Communication and Income Tax Compliance." Television and Human Behavior. Arons, Leon and May, Mark A. eds. New York: Appleton-Century-Crofts. 1963.

- Educational
    - Vocational (for adults)
    - "Better living"--"how-to," consumer education, and welfare programs
    - "Better understanding"--documentaries, background information, "adult education"
- Information
    - Real-time coverage of current events
    - News
    - Job information
- Societal aids
    - Political programs
    - Discussions of local issues
    - Social control programs
- Locally produced nonprofessional programs

Appendix B

The Audience for Diversified Television

INTRODUCTION

Audiences for programs depend on several factors. In addition to the basic subject matter of the program, the quality of production and the time of presentation influence the size of a program's audience. In the following discussion, three separate estimates of the audiences for diversified* programming are made: The first estimate, which is conservative, is based on present ETV audiences, and assumes no increase in program quality or in the allocation of the individual's time to television. The second estimate explores the implications for audience size if individuals substitute television for other media in obtaining information and entertainment. This estimate sets upper limits on the audiences for diverse programming. The third is an estimate of audiences for heavy entertainment and information programs produced and promoted to commercial television standards.

Finally, some qualitative aspects of the diversified television audience will be discussed. Certain data exist which indicate that this audience is likely to be composed of well-educated, high-income people. Further, the reach of the proposed medium will probably be much greater among these people than in the population as a whole.

THE EXPECTED AUDIENCE

The following assumptions were made to estimate the expected audience: The audience for diversified television will be limited to groups who would otherwise watch educational television; and the frequency with which diversified television will be watched by those who view it will increase, at the expense of commercial television.

Support for the Assumptions

The first assumption is based upon the fact that most people prefer light entertainment to all other program types. This was demonstrated clearly in a study by Steiner.† He interviewed 2,498 adults throughout the United States to determine their television viewing habits and attitudes, and found that they preferred light entertainment and had few complaints about television.

---

*"Diversified" in this discussion is used to refer to programs other than the light entertainment programs that make up the great majority of commercial television schedules.

†Steiner, Gary A. The People Look at Television. New York: Alfred A. Knopf. 1963.

Another aspect of the study involved interviewing in 237 New York households which had been included in the American Research Bureau (ARB) diary sample several months before. Subjects were asked for their criticisms of television, and demographic characteristics were obtained. The first question which interested Steiner was whether program types were watched in proportion to their availability. He compared schedules with the ARB diaries and found a very close relationship (see Table B-1), indicating that people were not tending to seek out the few serious program types and, hence, to watch them in greater proportion than they were available.

Table B-1
Programs Available Versus Programs Watched

	Average Number of Programs per Week	
	Available	Watched per Viewer
All	758.7	32.0
Action	121.8	7.0
Comedy/Variety	134.0	6.0
Light Drama	61.3	2.2
Light Music	22.8	1.2
Sports	28.4	1.0
Regular News	150.9	9.2
Information and Public Affairs	68.4	1.5
Heavy Drama	15.3	1.5
Religion	42.0	0.7
Movies	112.4	1.9
Heavy Music	0.9	0.3

Source: Steiner, Gary A. The People Look at Television. New York: Alfred A. Knopf. 1963.

It might be argued, however, that program choices are limited by availability, so Steiner next looked at those time periods when heavy entertainment, heavy information, and light entertainment were shown simultaneously. By comparing ARB diaries with interview data for the same households, he found that even critics of television and the better educated tend to watch light diversion instead of serious fare when both are available (see Table B-2), although more than 60 percent of college educated people opted for more serious programs.

Table B-2
Viewer Choices*

	Percentage Choosing		
	Heavy Entertainment	Heavy Information	Light Entertainment
All viewers	31 %	5 %	64 %
College educated	53	9	40
High school educated or below	22	4	74

---

*When heavy information, heavy entertainment, and light entertainment were available simultaneously.

Source: Steiner, Gary A. The People Look at Television. New York: Alfred A. Knopf. 1963.

The Steiner interviews were conducted in 1960; thus it is possible that viewers' attitude and preferences have changed over the 8-year period. To determine whether this was so, the ARB ratings for ETV stations in nine large cities for January 1968 were examined. Program schedules were obtained from seven of the ETV stations so that programs could be classified according to the program taxonomy described in Section III. Prime time (6:00 to 11:30 PM) ratings for each program type were averaged, and the results are given in Table B-3.

Table B-3

Educational Television Ratings by Program Type, January 1968

Program Type	Number of Half-hour Programs*	Mean Rating†
Entertainment		
Light	10	0.85
Heavy drama	62	1.03
Heavy music	37	0.88
Sports	4	0.50
Educational		
Vocational and high school or college classes	38	0.59
"How to"	12	0.83
Documentary	71	0.78
Cultural	33.5	0.93
Cooking, language, and music lessons	16	1.03
Information		
Real-time coverage	0	--
News	27	1.46
Political or news analysis	126	1.08
Job information	4	
Societal aids		
Political	0	--
Local issues	16.5	0.98
Social issues	5	0.80
Social control	1	0.50
Locally produced amateur	0	--
	463	0.95

---

*Number of programs on all seven stations between 6:00 and 11:30 p.m. on all seven days of an average week in January 1968.

†When American Research Bureau rating was -1, which indicates less than 0.5 percent, it was counted as 0.5. Thus, average ratings are somewhat overstated.

Source: Compiled from Market Report. American Research Bureau. January 1968. Reports for Pittsburgh, Washington, D.C., New York, Minneapolis-St. Paul, Philadelphia, Chicago and San Francisco were used.

Two results are apparent from the table. First, despite the fact that values of 0.5 percent were assigned to programs for which ARB estimated the audience at less than 0.5 percent, the ratings were very low. Less than one percent of television households can be expected to tune in on the average ETV program. Second, news, political or news analysis, heavy drama, and lessons in cooking, languages, or music are the most popular types of programs, drawing, on the average, a little more than one percent of television households. The first result supports the first assumption: Since most of the program types foreseen for diversified television are represented on ETV now, their current ratings approximate those which can be expected for diversified television. The second result gives some support to the second assumption, in that careful selection of program type and upgrading of overall program quality should lead to increased viewing of programs other than light entertainment by those who view them now.

Another argument which might be raised against the first assumption is that increasing leisure will free more and more hours for television watching, and that some of this additional time will surely be allocated to diversified television. According to data in Appendix E, however, leisure has not increased significantly in the past 30 years, so any increase in time spent with television must be taken away from some other leisure activity.

The Size of the Audience: Reach

Data from two studies of ETV indicate that the proportion of the adult population which watches ETV "at all" has been declining, while the proportion which watches it "regularly" has remained constant. The earlier study was conducted in 1962 by Schramm et al.* They conducted thousands of telephone interviews in several locations with ETV stations, and followed up with home interviews. ETV viewers were classified as regular (one or more programs per week), occasional (less than one program per week), and nonviewers. The results of the telephone interviews are given in Table B-4.

Thus, half of all respondents with television sets (over 90 percent of respondents had TV sets) sometimes watched ETV, 17 percent watched regularly. In the three largest cities, 22 percent were regular viewers.

---

*Schramm, Wilbur; Lyle, Jack; and Pool, Ithiel de Sola. The People Look at Educational Television. Stanford, California: Stanford University Press. 1963.

Table B-4

Educational TV Viewing, 1962

Location	Sample Size	Percent Regular Viewers	 Occasional Viewers	 Nonviewers
Boston, Massachusetts	8,666	21 %	31 %	48 %
Pittsburgh, Pennsylvania	1,749	24	40	36
San Francisco, California	4,187	24	38	38
Lincoln, Nebraska	3,290	9	37	54
Columbus, Ohio	1,930	3	11	86
Denver, Colorado	3,280	13	32	55
Alabama (3-station network)	4,773	11	29	60
Total (except Columbus)*	25,945	17 %	33 %	50 %

---

*Columbus was omitted because its station was a UHF station, and only 15 percent of homes could receive UHF at the time the study was made.

Source: Schramm, Wilbur; Lyle, Jack; and Pool, Ithiel de Sola. The People Look at Educational Television. Stanford, California: Stanford University Press. 1963.

A survey of 1,844 housewives in 14 metropolitan areas conducted in February 1967 by Advertising Measurements, Inc. (AMI), showed that 39 percent were at least occasional viewers of ETV, and 26 percent watched three or more programs per month.* The three or more programs per month category corresponds generally with the regular viewer category of the earlier study. Since the AMI study was limited to cities in the class of the three largest cities of the earlier study, the 26 percent is comparable to the 22 percent of the Schramm et al study. The apparent increase of 4 percent, however, is illusionary: The AMI sample was limited to nonslum neighborhoods, where ETV viewing is likely to be greater.

---

*Public Television. Prepared for Peter M. Robeck and Company, Inc. New York: Advertising Measurements, Inc. February 1967.

Based upon these two studies, it can be concluded that no more than 20 to 25 percent of the urban population is regularly reached by ETV. Among nonurban people, the proportion is far less. Since ETV and, by assumption, diversified television have greater appeal to the more highly educated, it may be expected that as the average education of the population increases, so will the reach of those media. In 1960, 16 percent of the adult population had been exposed to college; in 1980, the proportion is expected to be 21 percent.* If it is assumed that regular viewers of ETV-diversified television will increase proportionately, and if the Schramm et al proportions of regular urban viewers hold, then 29 percent will be regular viewers in 1980. Since the change in educational attainment will probably be greater in urban places than in rural, assume a reach of 30 percent by 1980.

Table B-5 gives projections of the adult audience which are expected to be reached by diversified television in 1970, 1975, and 1980, under the assumption that all residents of Standard Metropolitan Areas (SMSA's) in the United States are exposed.

Table B-5

Projected Reach of Diversified Television

Year	Adult* Population (000's)	Percent† in SMSA's	Adults Exposed (000's)	Percent Reached	Expected Audience	
					Regular	Total‡
1970	133,266	65.50 %	87,289	26 %	22,695	31,424
1975	144,939	66.75	96,747	28	27,089	36,764
1980	157,229	68.00	106,916	30	32,075	42,766

---

*Population 18 years old and older compiled from Current Population Reports. Series P-25, No. 381. "Projections of the Population of the United States by Age, Sex, and Color to 1990, with Extensions of Population by Age and Sex to 2015." U.S. Department of Commerce, Bureau of the Census. Washington: U.S. Government Printing Office. 1965.

†Based upon actual 1960 percent, and projected increase of ¼% per year.

‡Percent reached plus 10 percent (for occasional viewers) times adults exposed.

Source: Spindletop Research, 1968.

---

*Wattenberg, Ben and Scamon, Richard. This USA. New York: Doubleday. 1965.

In Table B-5, the exposure is assumed to be very broad, hence the audience estimates are optimistic. If, for example, only residents of SMSA's of a million or more inhabitants were exposed, the audience would be halved.

The Size of the Audience: Frequency

Data from the two studies previously cited reveal that the average regular viewer of ETV watched a little over two programs per week in 1962* and slightly under two per week in 1967.† Schramm _et al_ found the average program length to be 30 minutes, and an average regular viewer time of about 70 minutes per week.‡ Data in the AMI study, however, reveal that of the most popular ETV offerings, half are one-hour programs, and half are 30-minute programs.§ Thus, the average program length was 45 minutes in 1967, and the mean time spent per viewer appears to be about 80 minutes per week, slightly more than in 1962. The increase is not significant, however, when possible reporting errors are considered. The most meaningful inference to be drawn is that the time spent per week by the average ETV viewer has not been declining.

ETV viewers are also commercial television watchers. Schramm _et al_ found that although ETV viewers spent less time on all television than ETV nonviewers, they still spent more time with commercial than with ETV.** In the AMI study, subjects were classified into light, medium, and heavy users of ETV and of commercial television. When classes were compared, the largest number were in the "medium-medium" class, and the number of "heavy ETV-light commercial television" watchers was not disproportionate.††

Since the choices which diversified television would make available at any one point in time would be so varied, it is assumed that those who currently watch ETV regularly would give up 30 minutes per week of commercial TV time in 1975 and 1 hour per week in 1980 in favor of diversified television (which includes ETV). Table B-6 presents estimated viewer hours per week for regular viewers and all viewers under this assumption.

---

*Schramm _et_ _al_. _op_. _cit_. p. 53.

†Compiled from AMI, _op_. _cit_. p. 5.

‡Schramm _et_ _al_. _loc_. _cit_.

§AMI, _op_. _cit_. p. 12

**Schramm _et_ _al_. _op_. _cit_. p. 168

††AMI, _op_. _cit_. p. 12

Table B-6

Estimated Frequency of Viewing Diversified Television

Year	Number of regular viewers (000's)*	Average hours per wk.†	Total regular weekly hours (000's)	Number of occasional viewers (000's)*	Average hours per wk. (000's)‡	Total occasional weekly hours (000's)	Total weekly viewer hours (000's)
1970	22,695	1.25	28,369	8,729	.25	2,182	30,551
1975	27,089	1.75	47,406	9,675	.25	2,419	49,825
1980	32,075	2.25	72,169	10,692	.25	2,657	74,826

---

*See Table B-5

†Figure for 1970 is mean of average for 1962 from Schramm, Wilbur; Lyle, Jack; and Pool, Ithiel de Sola. The People Look at Educational Television. Stanford, California: Stanford University Press. 1963. and the average for 1967 from Public Television. prepared for Peter M. Robeck and Company, Inc., New York: Advertising Measurements, Inc. February 1967. Figures for 1975 and 1980 include assumed time borrowed from commercial television.

‡Based upon Schramm *et al* estimate. *op. cit.* p. 54

Source: Spindletop Research, 1968.

Thus, by 1980 about 72 million regular and about 75 million total adult viewer hours per week are expected to be spent with diversified television. The data from Tables B-5 and B-6 can next be combined to estimate the average rating for diversified television, in terms of the percent of urban adults expected to be watching at any particular time. If there are four hours per evening, or 28 per week, of prime time, all diversified television is viewed during prime time, and x percent of adults watch diversified television an average of y hours per week, then the average rating is given by: $r = y/28 \cdot x$ where r is the average rating.

Application of this formula yields average ratings for diversified television of 1.2 for 1970 (slightly over the mean ETV rating for January 1968. See Table B-3), 1.8 for 1975, and 2.4 for 1980. Several points should be remembered in connection with these ratings.

First, they are averages: Some programs will achieve higher ratings, some lower. Second, they are average ratings for all diversified television. If there are 20 channels of diversified television available, only 0.06, 0.09, and 0.12 percent of the adult population of the typical SMSA will be watching any one of them in 1970, 1975, and 1980. For an SMSA of one million adult inhabitants, the actual number of viewers would be 600, 900, and 1,200. Finally, if viewing time is spread over more hours than prime time, ratings would decline.

Thus far, it has been shown that the expected audience for diversified television is small relative to commercial television standards. Suppose, however, that diversified television has such an impact on American life that people give up other media (except commercial television) for it. What would the audience be then?

THE POTENTIAL AUDIENCE FOR DIVERSIFIED TELEVISION

The audience estimates just made were based on the assumption that no significant change would occur in the way in which people allocate time among television and other leisure time activities. By relaxing that assumption, it is possible to gain some understanding of what might happen if the availability of a large number of television channels carrying diverse programming caused a change in the sources people use for information and entertainment. By considering the substitution of television for other media, it is possible to estimate an upper limit for potential television audiences.

Time Spent on Other Media

The American's use of time survey conducted by the University of Michigan Survey Research Center, which is discussed in Appendix E, provides excellent recent data on how urban Americans allocate their time among activities. As Table B-7 shows, much of the time spent with communications media is also time spent on other activities.

The average time spent on media other than television is 0.1 hours per day on radio and 0.6 hours per day reading. Expanded to weekly hours, the numbers become 0.7 and 4 2. The 4.2 reading hours are allocated among newspapers, magazines, and books in the ratio 0.18: 0.18:0.64, or 0.75 hours each on newspapers andmagazines and 2.7 hours on books.

Table B-7

Summary of University of Michigan Time Use Survey
Free Time Activities
(hours per day)

	Primary Time			Secondary Time			Total		
Activity	Men	Women	All	Men	Women	All	Men	Women	All
Radio	0.1	--	0.1	0.8	0.9	0.9	0.9	0.9	1.0
Television	1.7	1.4	1.5	0.4	0.8	0.6	2.1	2.2	2.1
Reading	0.7	0.5	0.6	0.3	0.2	0.3	1.0	0.7	0.9

Source: Unpublished data (subject to correction) from the Survey Research Center of the University of Michigan.

The problem of the stability of the time budgets now must be addressed. Appendix E indicates that leisure will not increase significantly, at least until after 1980; and that time spent reading and listening to the radio has been declining in favor of commercial television. The question then is, Will still more time be shifted from reading and radio to commercial television instead of to diversified television?

A number of studies of time spent with commercial television have been reviewed by Robinson*, who finds that some studies show a two-hour per day average, and others an average of three hours per day, but virtually none show averages close to the midpoint of the two figures. Moreover, consideration of the time at which the various studies were made reveals no trend through time for television viewing to increase or decrease. Robinson concludes that there is little basis to assume that viewing habits are not stable. (The problem of how much time is actually spent on commercial television is not relevant to this discussion, except insofar as time reported spent with other media was actually spent on commercial television.)

---

*Robinson, John P. "Television and Leisure Time: Yesterday, Today and (Maybe) Tomorrow." Revision of paper given at the American Association of Public Opinion Research, May 1967, (unpublished). Survey Research Center, University of Michigan.

It will be assumed that the Michigan averages are accurate, however, for the remainder of this discussion.

Thus, the conclusion is that commercial television has reached the saturation point with respect to average time per viewer. Consequently, time spent with radio or reading is assumed to be stable at present, but subject to inroads by a new medium--diversified television.

Television programs could be substituted for both radio listening and reading in varying degrees. Most radio programs that serve as the primary activity for the listener could have television counterparts. Let us assume, therefore, that 0.5 hours per week would be shifted from the 0.7 hours now devoted to radio. Television programs are probably less substitutable for printed media. Let us assume, however, that half of the time spent with books and magazines could be switched to television.* Under these assumptions, then, a total of about 2.6 hours per week would be devoted to programs not presently available on television, or about 24.8 percent of the time devoted primarily to commercial television.

Size of Potential Audience

Assuming that 2.6 hours per week would be available for viewing diversified programs, the audience size can be estimated. Audiences would be 24.8 percent of audiences for commercial television; if the distribution of viewing throughout the day is assumed to be the same as for commercial television, audiences would be as indicated in Table B-8. During prime time, about 25 percent of the population would be viewing diversified television. This audience would be divided among the programs available at the time.

AUDIENCES FOR COMMERCIAL QUALITY PROGRAMS

Most present ETV programs are not produced to commercial television standards. Limited budgets for ETV dictate less elaborate production techniques--fewer cameras, for example--and as a result, these programs are less attractive to viewers than they might be. By

---

*Both radio and printed media clearly have qualities television does not. Printed media are extremely portable, for example, and radio is more portable than television. The estimates of substitutability, therefore, are admittedly tenuous.

Table B-8

Television Viewing

Time of Day	Percentage of Homes Viewing Commercial TV*	Estimated Percentage of Homes Viewing Diversified TV
9 AM	17 %	4.2 %
11 AM	24	6.0
1 PM	29	7.2
3 PM	30	7.4
5 PM	40	9.9
7 PM	52	12.9
9 PM	67	16.6
11 PM	34	8.4

---

*From "The Shaping of the Television Medium." speech by Roy Danish, Director, Television Information Office.

Source: Spindletop Research, 1968.

examining five situations in which diversified programs were produced to commercial standards, Spindletop Research* estimated the audiences for these programs. Table B-9 summarizes the results of that investigation. This table shows, for example that in the pay TV operations in Los Angeles, San Francisco, and Hartford, movies and sports averaged 12 percent penetration, and specials, e.g., concert by Joan Sutherland, averaged 3 percent. This table shows that the evidence from the different sources is reasonably consistent. Dividing noncommercial programming into two large categories--entertainment and information--permits estimating viewers' program preferences. On the basis of the data in Table B-9, the estimated relative preferences are:

Commercial	6
Noncommercial	
Entertainment	3
Information	1

---

*For a more detailed discussion, see The Evaluation of Alternatives for the Production, Distribution, and Financing of Television Programs. Lexington, Ky: Spindletop Research, April 1967.

The relative preference of viewers for noncommercial and commercial programs depends on the mix between entertainment and information in the noncommercial programming. Assuming equal amounts of the two types of programs, commercial programming is preferred to noncommercial programming by an estimated ratio of 3 to 1.

Table B-9

Programming Summary

Source	Program Category	Relative Audience Size	Ratio of Commercial to Noncommercial Programming
1965-1966 program ratings	Public affiars	6.4	2.6:1
	All others	16.8	
1966 program ratings	Commercial programs	18.9	2.6:1
	Noncommercial programs	7.3	
STV--Hartford, Los Angeles and San Francisco	Movies and sports	12.0	4:1
	Specials and education	3.0	
Viewer choice behavior*	Heavy information	4.0	6:1
	Other	23.0	
	Heavy entertainment	15.0	2:1
	Other	31.0	
British television audiences	British Broadcasting Corporation programs	1.0	2:1
	Independent Television Authority programs	2.0	

---

*Steiner, Gary A. The People Look at Television. New York: Alfred A. Knopf. 1963.

Source: Spindletop Research. 1967.

CHARACTERISTICS OF THE AUDIENCE

The two studies of ETV cited earlier* provide substantial data which indicate that the audience for ETV (and by analogy, for diversified television) is better educated, more cultured, more active, and receives a higher income than the audience for commercial television. Moreover, ETV reaches very large percentages of high-income and well-educated groups. These findings indicate that advertisers might be interested in sponsoring, at least in part, some of the programs which might be offered on diversified television or ETV.

Table B-10 presents the proportion of regular viewers and nonviewers in the Schramm et al study who had some college training.

Table B-10

Educational Attainment of ETV Viewers and Nonviewers in 1962
Percent Having Some College Training

	Regular Viewers		NonViewers	
Place	Male	Female	Male	Female
Pittsburgh, Pennsylvania	22.1 %	37.3 %	24.0 %	12.7 %
San Francisco, California	63.6	63.7	28.3	20.2
Lincoln, Nebraska	65.3	58.0	38.2	27.0
Columbus, Ohio	70.5	55.2	32.7	27.7
Denver, Colorado	52.8	49.6	20.0	20.3
Alabama (3-station network)	49.6	60.8	16.0	13.5
Boston, Massachusetts	47.0	39.0	18.0	10.0

Source: Schramm, Wilbur; Lyle, Jack; and Pool, Ithiel de Sola. The People Look at Educational Television. Stanford, California: Stanford University Press. 1963. pp. 63 and 182.

---

*Schramm, Wilbur; Lyle, Jack; and Pool, Ithiel de Sola. The People Look at Educational Television. Stanford, California: Stanford University Press. 1963. and Public Television. Prepared for Peter M. Robeck and Company, Inc., New York: Advertising Measurements, Inc. February 1967.

Thus, except for Pittsburgh men, viewers were far more likely to have been exposed to college than nonviewers. Income data were gathered only for Boston in the Schramm _et al_ study, where 19 percent of viewers and 11 percent of nonviewers had incomes of $7000 or more.*

A cultural scale was also used in the Schramm et al study, in which respondents were scored according to the number of cultural activities in which they participated or were interested. Results are summarized in Table B-11. Obviously, viewers are on the average more culture-oriented than nonviewers.

Table B-11

Cultural Interest Index for ETV Viewers and Nonviewers

Score	Percent of Viewers	Percent of Nonviewers
0	10	20
1	22	42
2	20	25
3	20	11
4	14	1
5	11	1
6	3	0
TOTAL	100	100

Source: Schramm, Wilbur; Lyle, Jack; and Pool, Ithiel de Sola. _The People Look at Educational Television_. Stanford, California: Stanford University Press. 1963. p. 203.

In the Boston survey also, ETV viewers were much more active than nonviewers. Larger percentages of ETV viewers than nonviewers regularly participate in such activities as going to lectures, concerts, and theater; attending club meetings; and taking evening courses. Equal percentages attended movies and sporting events. The time spent on these other activities was greater for ETV viewers also. The only activity on which less time was spent by ETV viewers was watching commercial television.

---

*Schramm _et al_. _op. cit_. p. 196.

In the AMI study, 37 percent of ETV viewers were college graduates or better, and of all the graduates in the sample, 52 percent watched ETV. Of those with post-graduate training, 59.6 percent watched. Sixty-five percent of the viewers earned $8,000 or more per year, and of those in the sample earning $25,000 or more, 59 percent were ETV viewers. Audience characteristics are summarized in Table B-12.

Table B-12

Audience Characteristics in AMI Study
Weight of Viewing by Percent of Education Group

	Light Viewer (1 to 2 times per month)	Medium Viewer (3 to 6 times per month)	Heavy Viewer (7 or more times per month)
Grade school	4.7 %	8.9 %	2.6 %
Some high school	8.8	8.0	4.4
High school graduate	11.6	16.2	8.4
Some college	9.8	18.2	9.5
College graduate	15.6	17.7	16.6
Post graduate	9.3	21.7	24.6
Weight of Viewing by Percent of Income Group			
Under $3,000	4.3 %	9.4 %	5.8 %
$4,000 to $5,999	14.7	9.7	7.8
$6,000 to $7,999	10.0	14.9	7.4
$8,000 to $9,999	9.7	15.6	9.4
$10,000 to $14,999	12.1	19.0	12.3
$15,000 to $24,999	9.5	18.9	21.3
$25,000 and Over	5.6	27.8	24.1

Source: Public Television. Prepared for Peter M. Robeck and Company, Inc. New York: Advertising Measurements, Inc. February 1967. p. 7.

The table is read thus: Of all the people in the sample with a grade school education, 4.7 percent were light watchers of ETV, 8.9 percent were medium watchers, and 2.6 percent were heavy watchers. (The remaining 83.8 percent watched less than once per month or not at all.) The interesting point about Table B-12 is the proportion of high-income people reached by ETV. Nearly 25 percent of the $25,000 and over group watch ETV at least seven times per week.

Even more interesting is the fact that specific series on ETV are watched by large proportions of high-income people. Thirty-seven percent of those earning $25,000 or more had watched the "French Chef" once or more during the previous month, and 28 percent had watched "NET Playhouse."[*]

In order to estimate the high-income audience for specific outstanding programs on ETV or diversified television, the first fact to uncover is the proportion of families with high income. In the AMI study, 9.5 percent of those reporting income earned $15,000 to $24,999, and 3 percent earned $25,000 or more. But the AMI sample was restricted to nonslum households. The 1966 Survey of Consumer Finances, with a larger and more broadly based sample, found that 10 percent of all families had incomes of $15,000 or more.[†] If the AMI percentages are scaled accordingly, then 8 percent of families are in the $15,000 to $24,000 bracket, and 2 percent in the $25,000 and over bracket.

Beginning again with a city of one million inhabitants, recall that 64 percent of the population is 18 and over.[‡] Now, if 8 percent of the adults are in families earning $15,000 to $24,999, and if 25 percent of these watch a particular ETV program,[§] and if 2 percent are in families earning $25,000 or more, and if 37 percent of these watch the program,[**] we have:

640,000 x 0.08 x 0.25 = 12,800 audience in $15,000 to $24,999 class

640,000 x 0.02 x 0.37 = 4,736 audience in $25,000 or over class or a total high-income audience of 17,536, representing about half as many family units. (The overall rating might still be very low--for the program which achieved these percentages of high-income groups, the overall sample proportion watching was 14 percent.)

---

[*] AMI, op. cit. p. 13.

[†] Katona, George; Mueller, Eva; Schmiedekamp, Jay; and Sonquist, John A. 1966 Survey of Consumer Finances, Monograph No. 44, Survey Research Center, Institute for Social Research, University of Michigan. p. 15.

[‡] Current Population Reports. Series P-25, No. 381. "Projections of the Population of the United States by Age, Sex, and Color to 1990, with Extensions of Population by Age and Sex to 2015." U.S. Government Printing Office. 1965. p. 6.

[§] AMI, op. cit. p. 13.

[**] Ibid.

If it is assumed that 8,500 high-income families in a city of one million would watch specific diversified television programs, and the programs could be broadcast--simultaneously or serially--to all SMSA's, the total high-income audience could approach four million families. Remember that this is the maximum potential high-income audience based upon current experience. To achieve it would require several reshowings in each city. (This is the custom with ETV today, and with diversified television the number of reshowings necessary to obtain a large proportion of those who wish to watch would increase because of the competition at any one showing).

These findings suggest that producers of high-priced consumer goods or of producers goods could find it advantageous to sponsor some programs on diversified television. There would be many programs, however, which would not achieve sufficient audiences for advertiser support.

SUMMARY

The audience for diversified television has been estimated under several different sets of assumptions: First the appeal of diversified television will be limited to those who would otherwise watch ETV, and this audience will not shift significant amounts of the time from other activities to television.

Under these conditions, it was estimated that 30 percent of the adult urban population would be reached by diversified television by 1980, and would spend a total of 75 million viewer-hours per week with the medium. The average rating for all diversified television stations would be 2.4 percent. Although very small, this audience would have qualitative features which might permit part of the cost of diversified television to be borne by advertisers.

The second estimate assumed that individuals would substitute television for some present uses of radio and printed media, thus they would watch diversified television an average of 2.6 hours per week. The average audiences for all diversified television stations together would be about one-quarter of commercial television audiences, or about three-quarters of the audience for a single commercial program.

Finally, audiences for a combination of information and heavy entertainment programs produced to commercial standards were estimated to be about one-third those of an average commercial program.

Appendix C

Survey Questionnaire

To obtain information about station operations, the National Association of Broadcasters conducted a survey for Spindletop. The survey questionnaire and some results of the survey are presented in this Appendix.

Survey Questionnaire

SPINDLETOP RESEARCH
SURVEY OF LOCAL STATIONS

Station Characteristics

VHF ____ or UHF ____

Size of market ____________________________ households (ARB)

Number of years on air __________

Number of other stations in market

Commercial ___________VHF ______________UHF

Educational ___________VHF ______________UHF

Is Station affiliated with a national network? ____Yes ____No

Station's net weekly circulation __________________households

Programming

This questionnaire is concerned with local programming provided by your station. For the purposes of this questionnaire, a local program is any program originated or produced by the station or for the production of which the station is substantially responsible. (This definition is the same as that given on the FCC Broadcast Application, except that the FCC definition requires that live talent be employed more than 50 percent of the time; for this questionnaire, there is no such requirement for the use of live talent.) Local program does not, therefore, include syndicated programs or feature films.

3

1. For the average week reported in the February-March 1968 ARB, please insert below the following information regarding local programming provided by your station.

(a) Program category	(b) No. of programs	(c) Total hours/ week	(d) Avg. ¼-hour audiences (in households) for these programs
Agricultural			
Entertainment			
News			
Public Affairs			
Religious			
Instructional			
Sports			
Editorials			
Political			
Educational Institutional			
Other			

Instructions for Question 1: The program categories above are the same as those given on the FCC Broadcast Application. For each category, the number of local programs in that category should be entered in column (b). In determining the number of programs, each broadcast of a daily program should be counted as one program, e.g., a local news broadcast five days a week at 6 p.m. should be counted as five programs. The total hours of programming should be shown in column (c). For each local program in the category, the average quarter-hour audience should be determined from the ARB Market Report (from column 3--"TV Households" of the ARB report). If more than one rating is reported for the program, then these must be averaged to determine the program's audience. The average audiences for each program in the category should be added together, and the sum reported in column (d).

Example: Suppose that a particular station carries a 15-minute farm report Monday through Friday, and a one-hour farm program on Sunday. The total number of agriculture programs would then be 6, and the total hours of programming would be 2¼. For the hour-long Sunday program the average quarter-hour audience would be determined by averaging the audiences reported for the program by ARB in the time slots in which the program was shown. If the program was carried in the 9-10 a.m. slot, and the 9:00 rating was 15.0 households and the 9:30 rating 14.2 households, then the average audience for the program would be 14.6. The audience for the daily morning program would be reported by ARB as an average for Monday through Friday; if this average were 3.1 households, then the sum of the audiences for each individual program would be five times this, or 15.5. The total average quarter hour audiences for agricultural programs would then be 14.6 + 15.5, or 30.1 households, and this number would be entered in column (d).

2. Please estimate the total hours of local programming provided in 1967 for the following categories:

Agricultural	____________ Hours
Entertainment	____________
News	____________
Public Affairs	____________
Religious	____________
Instructional	____________
Sports	____________
Editorials	____________
Political	____________
Educational Institution	____________
Other	____________

Revenues and Expenses

1. What was your station's total revenue from the sale of advertising time in 1967? $________________
2. What were total station expenses in 1967? $________________

3. What was the total revenue from sale of time to local advertisers in 1967 (including trades)? $________________

4. How many different local advertisers bought time in 1967?

____

5. What products or services were advertised by your five largest local advertisers in 1967?

Table C-1

Characteristics of Stations in Sample

		Total Stations
		56
Type of Station		
VHF Stations		46
UHF Stations		10
Affiliation with National Network		
Affiliated		50
Non-affiliated		6
Number of TV Households in Market*		
Less than 100,000		5
100,000 - 249,999		6
250,000 - 499,999		15
500,000 - 749,999		14
750,000 - 999,999		5
One million and over		11
Station's Net Weekly Circulation*		
Less than 100,000		9
100,000 - 199,999		14
200,000 - 299,999		8
300,000 - 499,999		12
500,000 and over		13
Number of Years on Air		
1-5 years		8
6-10		3
11-15		33
11-14	14	
15	19	
16-20		9
More than 20		3

---

*Source: ARB, 1967 Television Market Analysis

Table C-2
Total Number of Local Programs Per Average Week

Number of Programs	Agricultural	Entertainment	News	Public Affairs	Religious	Instructural	Sports	Editorials	Political	Educational Institutional	Other
0	16	12	--	4	5	28	11	40	50	22	39
1	9	4	--	15	13	3	7	2	4	12	2
2	2	7	--	4	10	4	1	1	--	7	4
3	--	2	--	5	4	1	2	5	--	1	--
4	1	2	--	6	3	--	--	--	--	1	--
5	10	7	1	3	1	7	2	1	--	3	5
6-10	15	10	3	13	12	9	12	6	1	10	5
11-20	3	9	13	4	8	4	20	1	--	--	1
21-30	--	1	15	1	--	--	1	--	--	--	--
31-40	--	--	15	--	--	--	--	--	--	--	--
41-50	--	1	5	1	--	--	--	--	1	--	--
15 or more	--	1	4	--	--	--	--	--	--	--	--
Not Reported											
Total Stations	56	56	56	56	56	56	56	56	56	56	56

Table C-3

Total Station Revenues and Expenses in 1967

	1967 Station Revenue	1967 Station Expenses
Less than $500,000	5	6
$500,000-999,999	12	14
$1,000,000-1,499,999	12	11
$1,500,000-1,999,999	4	5
$2,000,000-3,499,999	7	12
$3,500,000-4,999,999	4	3
$5,000,000-9,999,999	8	1
Not Reported	4	4
Total Stations:	56	56

Table C-4

Station Gross Profits in 1967

	Stations Reporting Gross Profits		Stations Reporting Losses
Less than $50,000	7		5
$50,000-99,999	2		1
$100,000-199,999	6		-
$200,000-299,999	5		-
$300,000-399,999	3		1
$400,000-499,999	3		1
$500,000-599,999	3		-
$700,000-999,999	5		1
$1,000,000-2,499,999	5		1
$2,500,000 and over	3		-
Not Reported		4	
Total Stations:	42	4	10

Table C-5

Total Revenue from Local Advertisers in 1967

Local Ad Revenue:	
Less than $100,000	1
$100,000-199,999	4
$200,000-299,999	6
$300,000-399,999	5
$400,000-499,999	7
$500,000-599,999	4
$600,000-799,999	8
$800,000-999,999	5
$1,000,000 and over	11
Not Reported	5
Total Stations	56

Table C-6

Number of Local Advertisers in 1967

Number of Advertisers:	
Less than 50	1
50-79	2
80-99	6
100-129	4
130-149	11
150-179	6
180-199	4
200-249	12
250-299	6
300-499	2
Over 500	2
Total Stations	56

Table C-7

Products and Services Advertised by Station's Five Largest Advertisers in 1967

	Number of Stations Reporting
Soft drinks	52
Banks	44
Automotive	35
Furniture/appliances	29
Utilities	23
Supermarkets/food stores	19
Food products	18
Department stores	13
Bread/bakery products	10
Beer	6
Gas/oil	5
Toys	4
Insurance	3
Entertainment centers	3
Homes/construction	2
Dry goods	2
Jewelry	2
Restaurants	2
Single mentions: Household cleaners, income tax service, carpeting	3

Table C-8
Total Hours of Local Programming in 1967

Number of Hours/Year	Agricultural	Entertainment	News	Public Affairs	Religious	Instructional	Sports	Editorials	Political	Educational Institutional	Other
0	10	4	--	--	3	15	4	31	24	12	33
1-10	3	5	--	4	1	10	1	17	25	7	4
11-20	3	4	--	3	3	3	3	4	6	8	2
21-30	7	2	--	11	7	8	5	1	--	7	3
31-40	2	--	--	1	5	1	6	3	--	1	--
41-50	8	1	--	3	--	2	6	--	--	2	2
51-60	6	3	--	4	10	3	1	--	--	2	2
61-80	8	7	--	3	8	--	4	--	1	4	1
81-100	4	1	--	4	7	2	9	--	--	1	1
101-150	3	10	1	12	8	5	10	--	--	6	3
151-300	2	9	25	9	4	5	5	--	--	6	2
301-500	--	4	22	1	--	2	2	--	--	--	3
More than 500	--	6	8	1	--	--	--	--	--	--	--
Not Reported											
Total Stations	56	56	56	56	56	56	56	56	56	56	56

Table C-9
Total Quarter-Hour Audiences (in Households) for Local Programming Per Average Week

Number of Households (000's)	Agricultural	Entertainment	News	Public Affairs	Religious	Instructional	Sports	Editorials	Political	Educational Institutional	Other
0	15	13	--	4	5	28	11	40	50	22	39
Less than 1.0	3	--	--	1	2	1	--	--	--	1	--
1.0-4.9	11	1	--	6	10	5	--	--	--	11	3
5.0-9.9	4	4	1	5	8	3	2	1	1	7	1
10.0-14.9	2	--	--	4	8	1	1	--	--	1	1
15.0-19.9	6	4	--	5	1	--	--	--	1	--	--
20.0-24.9	1	2	--	1	--	--	2	1	1	--	2
25.0-49.9	2	6	2	9	9	1	1	2	--	4	2
50.0-74.9	1	4	3	2	2	2	2	2	--	1	1
75.0-99.9	--	2	3	3	1	4	5	1	--	2	2
100.0-149.9	2	2	1	3	3	1	5	2	--	1	2
150.0-499.9	5	9	15	7	2	3	17	--	1	1	--
500.0-999.9	--	2	12	1	--	2	1	4	--	--	1
1000.0 and over	--	4	14	--	--	1	5	--	1	--	--
Not Reported	3	3	5	5	5	4	4	3	1	5	2
Total Stations	56	56	56	56	56	56	56	56	56	56	56

Appendix D

Wired Distribution Systems

INTRODUCTION

Appendix D describes various distribution systems that are alternatives to over-the-air broadcasting. All could provide a greater number of channels to the home than is possible with over-the-air broadcasting, and all could be used in providing highly localized programming as well as network and citywide or areawide programs. In addition, all of these systems would provide drastic reductions in the use of the frequency spectrum for television distribution. The systems discussed include:

- Wired city--CATV type system
- Wired city concept with spatial distribution modifications
    - Short-hop microwave system--amplitude modulated link
    - Quasi laser system
    - Millimeter wave umbrella system
- Two-way coaxial cable system
- One-way video cable with information and video banks

WIRED CITY--CATV-TYPE SYSTEM

This system would provide twenty 6Mc television channels to each subscriber. A single, 20-channel coaxial cable would be extended throughout the city served, and all subscribers would be connected to this common cable. Within a house, the subscriber could connect any number of TV receivers to his entrance cable, and the desired program among those transmitted would be selected by the channel switch on the individual TV set, an operation similar to the program selection method used today.

Programs could be provided locally and via nationwide networks. The major differences between the wired city concept and today's CATV systems is that in the wired city the network or other programs which originate outside the city will be lead into the local distribution system via trunk cable or microwave route rather than over-the-air to the CATV head end antenna. The over-the-air frequency spectrum presently allocated for television will be freed for other uses in completely wired areas. However, the wired city concept will necessitate more route miles of transmission cable or microwave systems than the present network transmission layout. Trunk cables or microwave installations will be needed to cover the distance between the present-day television tower (usually located in the larger cities) and the smaller rural communities and towns served by present stations. (See Figure D-1.)

These local trunk routes comprise a significant portion of the total transmission costs for wired service. The Complan study* estimates that 15,000 local trunk routes will be needed to wire the country for 100 million TV set locations. These trunks will transmit one way from the area television station to the local communities and will average 50 miles in length. Total cost of the local trunk routes is estimated at just over $2 billion compared to the intercity network trunk estimate of $187 million.

It is doubtful that these local trunk routes could be served by satellite. One reason is that different local programs would be sent from the area station to their surrounding communities.

The wired city system can offer the subscriber 20 selections but does not provide the custom service offered by the switched systems. The switched service would utilize program libraries to provide the subscriber the program he desires at the time he wishes to watch it.

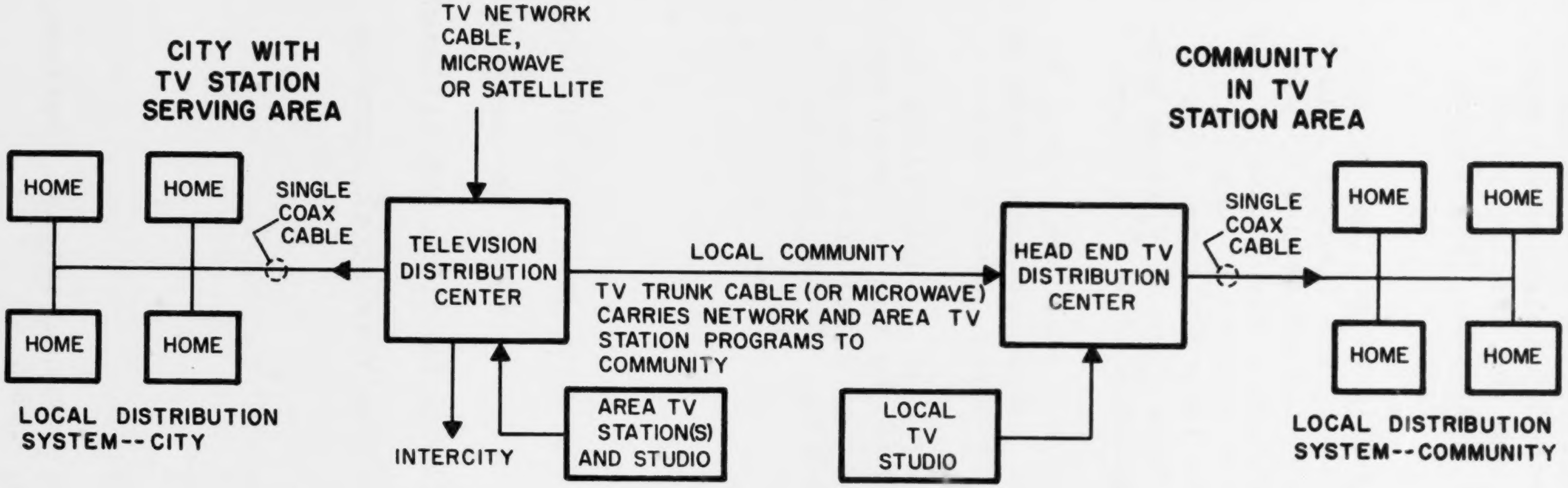
Possible Uses of Such a System

Inputs

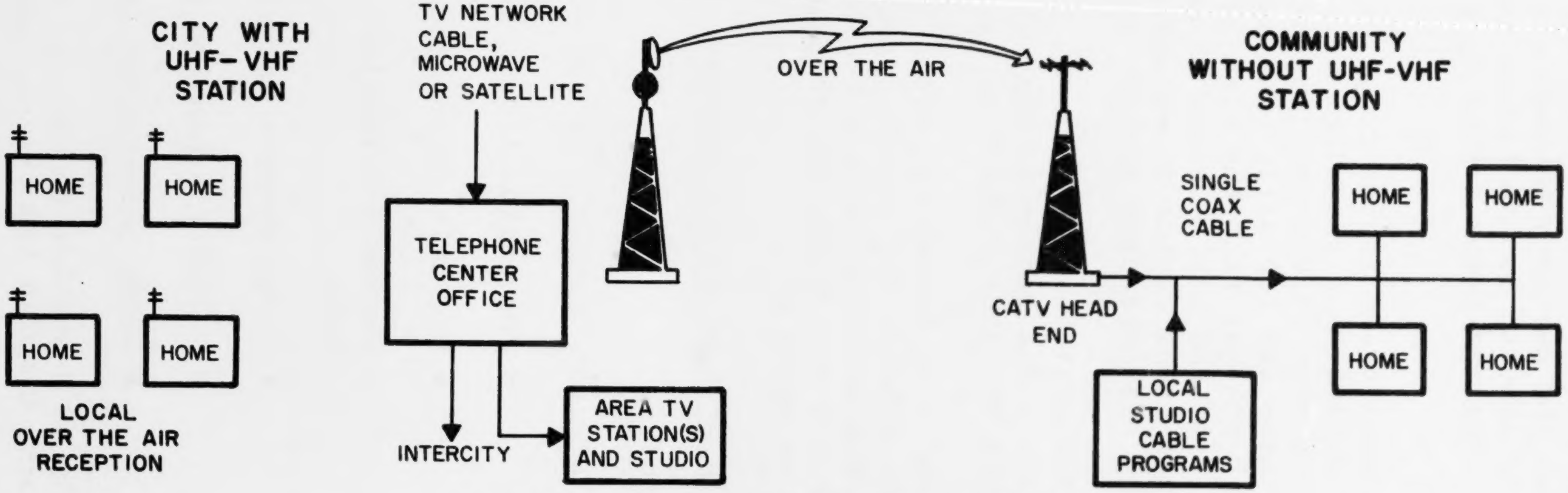
- Twenty channels of television programs which may include:
    - Conventional television programs (local and network)
    - Pay television programs (local handling and billing)
    - Market information such as New York Stock Exchange tape
    - Video shopping services
    - Credit and banking services
    - Other information services.

---

*A Study of Distribution Methods for Telecommunications. Suffern, New York. Complan Associates, Inc., May 1968.


CITY WITH TV STATION SERVING AREA
TV NETWORK CABLE, MICROWAVE OR SATELLITE
COMMUNITY IN TV STATION AREA
HOME
HOME
HOME
HOME
SINGLE COAX CABLE
TELEVISION DISTRIBUTION CENTER
LOCAL COMMUNITY
TV TRUNK CABLE (OR MICROWAVE) CARRIES NETWORK AND AREA TV STATION PROGRAMS TO COMMUNITY
HEAD END TV DISTRIBUTION CENTER
SINGLE COAX CABLE
HOME
HOME
HOME
HOME
LOCAL DISTRIBUTION SYSTEM--CITY
INTERCITY
AREA TV STATION(S) AND STUDIO
LOCAL TV STUDIO
LOCAL DISTRIBUTION SYSTEM--COMMUNITY

A WIRED CITY PLAN AND COMMUNITY IN TV AREA


CITY WITH UHF-VHF STATION
TV NETWORK CABLE, MICROWAVE OR SATELLITE
OVER THE AIR
COMMUNITY WITHOUT UHF-VHF STATION
HOME
HOME
HOME
HOME
TELEPHONE CENTER OFFICE
SINGLE COAX CABLE
HOME
HOME
HOME
HOME
CATV HEAD END
LOCAL OVER THE AIR RECEPTION
INTERCITY
AREA TV STATION(S) AND STUDIO
LOCAL STUDIO CABLE PROGRAMS

OVER THE AIR CITY WITH UHF OR VHF STATION AND COMMUNITY IN AREA WITH CATV

Figure D-1. Comparison of Layouts for Wired City and Over The Air--CATV Systems

Outputs

The system would still provide a narrow band response to program input via the majority of subscribers who have telephone service. These responses would be of the same variety offered in the switched video system with the exception of the custom service of selecting the program one wishes to see by dialing the program library.

It seems quite possible that the existing telephone system could be integrated to work in conjunction with the wired city system or one-way video described in the following pages. It is desirable to offer the TV viewer wide program diversity, but if a great variety of programs is offered, some of these offerings could be designed to require a subscriber response. The telephone could provide the means for this response. Now the response to TV requests is by mail order or telephone conversation. Various other apparatus such as data phone sets and facsimile machines may be attached presently to existing telephone lines.

Costs

The costs to the subscriber for wired service are shown in Table 1.

Table 1
Added Costs To Public For Wired Service

No. of TV Locations (millions)	Capital	Annual	Monthly
10	$ 176	$ 55.50	$ 4.63
50	170	54.00	4.50
100	1,230	387.00	32.25

Source: A Study of Distribution Methods for Telecommunications. Suffern, New York. Complan Associates, Inc., Exhibit 4, May 1968--includes 50 percent to cover equity, capital, income taxes, and profits.

Spindletop Research

WIRED CITY CONCEPT WITH SPATIAL DISTRIBUTION MODIFICATIONS

The installed cost per mile of CATV cable varies widely throughout the country. Table 2 contains various estimates of these costs.

Installation costs in the New York City area, and probably other large cities, are extremely high. Cable must be pulled through ducts, spliced in manholes, enter buildings via underground conduits, cleated around walls and over rooftops, and distributed to the individual apartments via house cable. The drop cable from the pole to the customer's home, which is not included in Table 2, generally runs $20 per home. In New York the drop cost averages $43 per dwelling. In large cities, the drop consists

Table 2
CATV System Costs

Type of Community	Type of Plant	Cost Main Cable (Per Mile)	Cost Feeder Cable (Per Mile)	Average System Cost (Per Mile)
Small Kentucky town 10,000 population*	aerial†	$4,000	$2,000	$3,000
Ameco Company average--all systems large and small cities‡	aerial	-	-	4,000
Average for U.S. Systems§	aerial	-	-	6,500
Teleprompter Company New York City	Underground & aerial	Up To 125,000**	7,000**	-
Rural Systems Average	aerial	-	-	5,000

---

*Interview with Tom Gullett, President, local CATV company

†Generally the cost of aerial plant does not include cost of changing out certain poles on existing pole line. These changes are necessitated by additional pole height or strength requirements.

‡Interview with Doug Shank, Ameco Corporation, Phoenix, Arizona

§A Study of Distribution Methods for Telecommunications. Suffern, New York. Complan Associates, Inc., May 1968

**Spencer, Walter. "Wiring New York Biggest Risk, Wildest Promise for Cable TV," Television, Vol. XXIV, No. 9. September 1967.

of a house cable which distributes the signal to apartments. The house cable may enter the building by air or underground. In New York City underground entrance ducts cost from $3,000 to $5,000 per building, constituting the greatest expense. Because of the magnitude of these costs, other methods of distribution are being developed which are considerably less costly than underground cable. Two other systems which could have considerable impact on the method of CATV distribution and the wired city concept are in various stages of development.

Short-hop Microwave Distribution System--Amplitude Modulated Link (AML)*

This system consists of a CATV head end antenna connected to a transmitting antenna either omnidirectional type or pencil shaped beam type. The transmitter operates at the $18GH_z$ frequency, and remote dish design receiving antennas may be placed at any line-of-sight location within 20 miles of the transmitter. The present, first generation, AML equipment has a capacity of 12 TV channels, but equipment is being designed to offer 36 channels. The system is adaptable to metropolitan, suburban, and rural areas. General layouts for metropolitan and rural areas are described below:

Metropolitan Areas

In cities, the CATV head end and AML transmitter may be mounted on a centrally located skyscraper. The receiving equipment could be located on rooftops, and the distribution cable could extend from the equipment, run along rooftops, and feed down into the apartments of subscribers.

The receiver may also be mounted across rivers, bays, airports, and expressways from the transmitter and thus eliminate expensive crossings and dead runs of cable. (See Figure D-2.)

Suburbs and Small Town Areas

In this case, the receiver may be tower or pole mounted and distribute a signal to local CATV aerial distribution cable which would feed subscribers via drop cable to individual homes. Whether receivers would be placed at every city intersection to serve a block area would be determined by the cost of the receiving unit compared to the cost of distribution cable.

---

*Sales brochure, Theta Company Corporation, Los Angeles, California, Interview with Irving Kahn, Teleprompter Corporation, New York, New York.

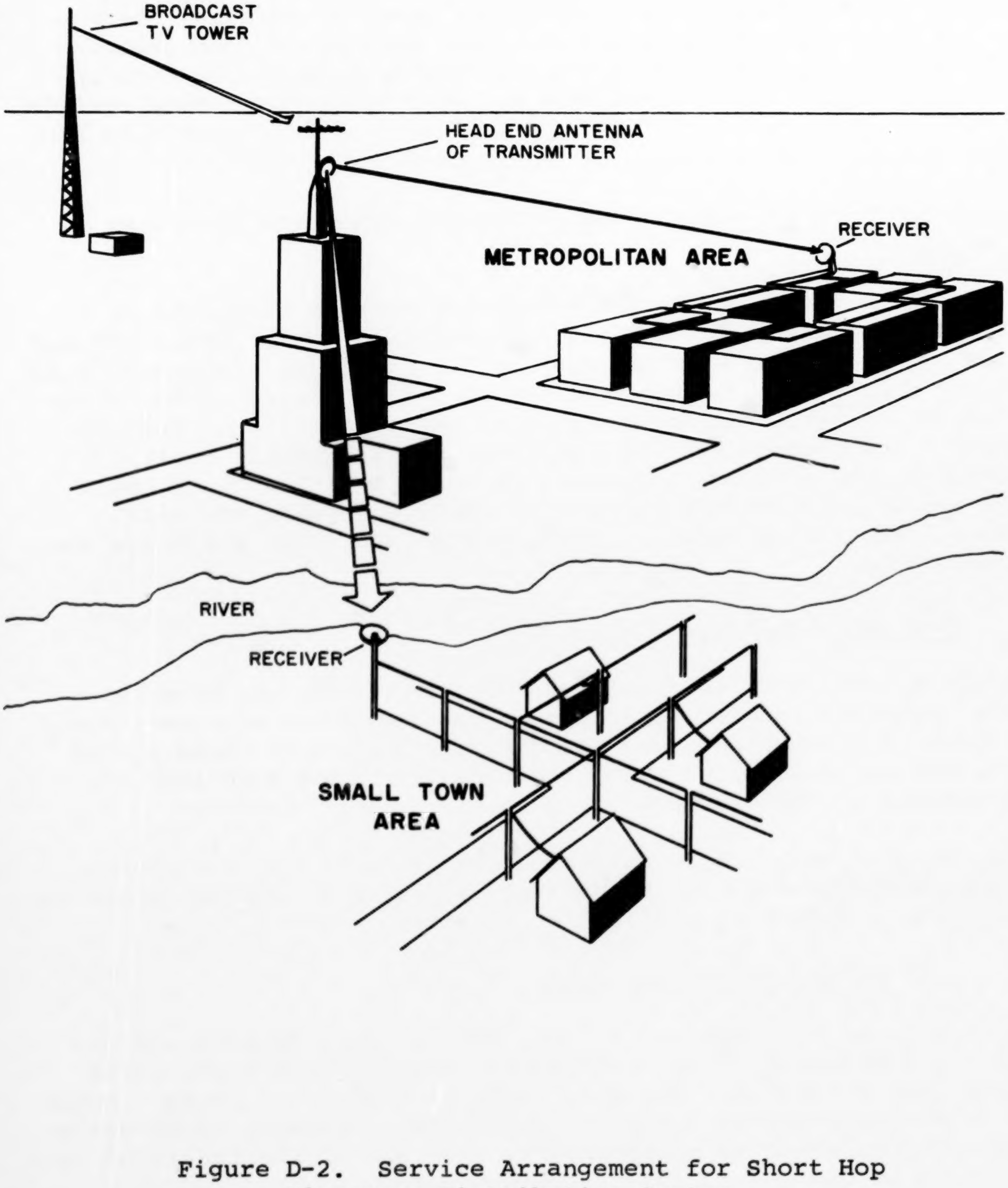

BROADCAST TV TOWER
HEAD END ANTENNA OF TRANSMITTER
RECEIVER
METROPOLITAN AREA
RIVER
RECEIVER
SMALL TOWN AREA

Figure D-2. Service Arrangement for Short Hop Microwave Distribution System

In any case, each receiving point in a town becomes a subdistribution point for normal cable plant.

State-of-the-Art

The Federal Communications Commission (FCC) has recently granted Teleprompter Corporation permission for temporary commercial use of the 18GH$_z$ spectrum for this short haul microwave system. This temporary license probably will extend into the mid-1970's or beyond. The area over which the system may be used is limited to New York City and two rural areas, the latter to be selected by Teleprompter. The FCC specified that the equipment must be offered to other CATV franchises in New York at reasonable rates. The equipment has passed the initial stage of development and is being manufactured.

Advantages of the System

Some advantages of this system are:

- Service does not have to be extended in geographic continuity. It can first serve areas of great need. Extensions of cable systems are determined in part by geographic location.
- The system is compatible with existing television receivers.
- Effects cost savings by omitting dead cable runs
- Effects savings in underground duct and pole space
- Possible maintenance advantages because of fewer route miles of line to maintain
- Flexibility to follow changing growth areas in communities
- The AML system is compatible with existing equipment used by the CATV industry.
- Installation of equipment is relatively easy compared to cable runs
- A city franchise may not be needed in situations where no CATV cable is placed on utility poles or in underground ducts.

Possible Disadvantages

Some possible disadvantages are:

- Microwave distribution systems may be unreliable in rainy weather and subject to distortion and fading. However, Irving Kahn* says the transmission is of high quality and as reliable as existing cable transmission.

- Microwave systems may be inefficient and require excessive power to operate.

Quasi Laser Distribution System

Basically, this system is similar in function to the AML system. It utilizes a head end antenna connected to a transmitter and remote receivers. The principal differences between the quasi laser and AML systems are noted in Table 3

State-of-the-Art

The quasi laser system is in an early stage of development. An initial system which will transmit 12 channels is being developed for demonstration to the FCC. Bartell Media, which is using the system, has applied for an experimental operating permit to provide CATV service to Brooklyn, New York.

Advantages of the System

Conceivably, this system would offer many of the advantages offered by the AML system plus:

- Good reproduction of TV signal

- Rain or atmospheric conditions have little effect on the quality of transmission

- Not affected by passing aircraft

- Can work with carriers consisting of longwave, infrared lasers, and other quasi-optical wavelengths, including microwave

---

*Interview with Irving Kahn, Teleprompter Corporation, New York, New York. May 24, 1968.

Table 3
Principal Difference of Quasi Laser and AML Systems

Characteristics	Quasi Laser	AML
Modulation	Pulse modulation--varying both pulse width and spacing between pulses. This is a new modulation technique. System functions independent of frequency and can work with long- and shortwave carriers.	Single sideband amplitude modulation with totaly suppressed carrier
Frequency	Operates on frequencies just below visible spectrum. Behavior of $42GH_z$ waves is similar to that of light waves. Antenna and transmitter design utilize certain optical principles. Transmitter and receiver transducer are very directional	Operates on certain microwave frequencies, presently $18GH_z$. Transmitter and receiver are not as directional.
Transmission range	3-mile range* of receivers from system transmitter, limited by bad weather. Transmitters are very directional. Requires four transmitters for omnidirectional wave propagation.	20-mile range of receivers from system transmitter. Transmitters are either omnidirectional or directional.
Number of Channels	12 with a potential of 20 channels	12 with equipment being designed for 36.
Other	Mirrors mounted on buildings may be used to reflect waves from quasi laser transmitter around line of sight obstructions to receiving antenna.	-

---

*This 3-mile radius limitation will require several transmitting points and receiving systems to serve a large city or suburban area. This may be due to atmospheric absorption of waves emitted at this high frequency. Therefore, the physical equipment placement may be different than for the AML system.

Possible Disadvantages

The principal disadvantage of the quasi laser system is its limited range. However, the narrow band technique employed by this system allows the use of the same frequencies over and over in adjacent areas. In addition, rain and atmospheric conditions affect the range of transmission.

Costs*

Costs on a system in a preliminary stage of development are difficult to obtain. The cost of the over-the-air portion is estimated to be in the range of a few dollars per customer. The entire CATV cable and quasi laser system should cost less than $100 per customer. Metropolitan customers may be served for about one-half to one-tenth the cost of underground cable ducts and lead-ins to buildings.

Millimeter Wave Umbrella System

A new concept for local television distribution has been described by Dr. Kerns H. Powers.† (See Figure D-3.) This system would eliminate the use of distribution in urban areas and would utilize frequencies in the $60GH_z$ range, a frequency which has little practical use for over-the-air transmission at this time.

The television studio transmission point would be centrally located within the population center. The distribution system would consist of a small 3-way relay unit located at an intersection which can receive a signal from its nearest neighborhood in the direction of the population center and rebroadcast it to three adjacent one-way relay units. (See Figure D-3.) The relay units would be installed on telephone or street light poles. The one-way units could rebroadcast it to the succeeding unit along the block.

The absorption of the atmosphere is so great at the $60GH_z$ frequency that the transmission range is limited to several hundred feet and localized to the houses along the street between the relay points. Each subscriber would need a small receiving antenna with about a 4-inch aperture on a rooftop or windowsill aimed at the nearest relay point. High rise apartment buildings may

---

*Interview with Mr. Ira Kamen, Laser Link Corporation, New York, New York.

†Powers, Kerns H., Ph.D., "Diversity of Broadcasting," in Science and Technology. April 1968.

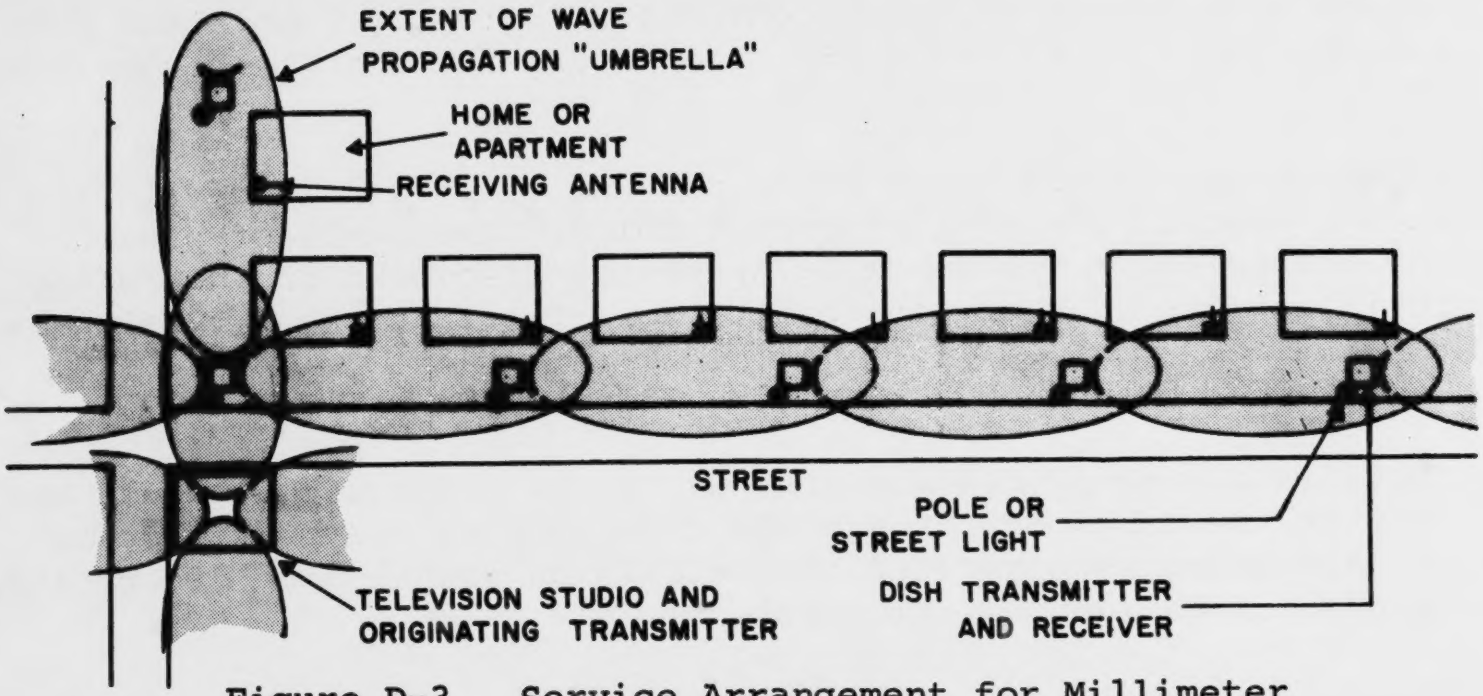

EXTENT OF WAVE
PROPAGATION "UMBRELLA"
HOME OR
APARTMENT
RECEIVING ANTENNA
STREET
POLE OR
STREET LIGHT
TELEVISION STUDIO AND
ORIGINATING TRANSMITTER
DISH TRANSMITTER
AND RECEIVER

Figure D-3. Service Arrangement for Millimeter Wave Umbrella System

need a single receiving point with redistribution to subscribers by house cable. A converter will be needed at each TV set to make this system compatible with existing circuitry.

Advantages of the System

This idea, which is presently in the conception state, utilizes some of the same concepts employed in the quasi laser system. One of its principal advantages is its potential for broadcasting to portable receivers. The high atmospheric loss is also advantageous. The same frequency may be used to serve other cities in the same region. The system also has the potential for offering 20 or more channels, depending on the bandwidth transmitted by the relay units.

Costs

Using 300-foot spacing, the system would require about 17 relay units per mile. To compete with cable systems which cost approximately $5,000 per mile, these relay units must be manufactured and installed at a cost of $295 per unit. Dr. Powers, the originator of this concept, feels that a manufacturing cost of $250 is "not unlikely." The converter and small antenna would replace the house drop cable in wired systems. CATV drop cable generally costs $20 per subscriber and ranges as high as $43 in New York City. Whether a set converter and small antenna could be installed for $20 to $40 is a matter of conjecture, but such costs do not seem excessive. UHF converters currently cost about $20 retail; small local range UHF outdoor antennas can be bought for $4.*

Although Dr. Powers knows of no one who is presently developing such a system, the idea is conceivable in the realm of present-day technology. The umbrella system is discussed in this study to illustrate another possibility for distribution of TV signals.

TV SET COST SAVINGS DUE TO WIRED DISTRIBUTION

There is a general disagreement as to the savings that would accrue to the consumer through the reduction of the retail price of television receivers if the television signal were distributed throughout the country via cable.

There are two basically different types of cable designs found in our investigation of CATV systems. Either system should provide a signal superior to over-the-air broadcasting for the following reasons:

- Cable is shielded from external interference such as neon signs, car ignition systems, airplanes, and atmospheric conditions, thereby yielding a superior signal-to-noise ratio.
- Cable should provide a stronger more consistent, and more uniform signal. Jerrold Corporation is installing CATV systems guaranteeing a 1,000-microvolt minimum signal and a 2,000-microvolt average signal.† Currently manufactured sets are designed to receive a minimum over-the-air signal of 100 microvolts for UHF and 50 microvolts for VHF. The signal quality in the wired city plan would be under control of the maintenance organizations and not subject to the uncontrollable factors of weather, atmosphere, and local intermittent interference to which over-the-air broadcasting is exposed.

However, the inherent differences in cable design in these two systems directly affect the cost of the television receiver. The distribution cable and set may be considered as a system; set reduction costs will be described in each system.

---

*Allied Radio, Catalog 270, 1968.

†Telephone interview with Mr. Tuning Jerrold, Jerrold Electronics, Philadelphia, Pennsylvania.

United States CATV Cable Design and Television Receiver System*

The cable manufactured in this country is designed to work with TV receivers which can receive over-the-air broadcasts. The cable has two conductors (one functions as a shield) which will simultaneously transmit six, twelve, or twenty 6Mc channels, depending on the system design. The television set needs a tuner to select the desired television channel out of the channels transmitted by the single cable. Under the wired city concept the current combination UHF-VHF tuner would be replaced with a single 20-channel tuner, but the manufacturers believe this new tuner would be as expensive as the current tuners. The cost of the tuner currently runs between $21 and $25, varying with the expense of the set.

If the signal strength were increased, via the wired city concept, from an average of 2,000 microvolts (today's CATV system) to 5,000 microvolts there might be some cost savings in the amplification equipment in the set. Many quality sets today have 3IF stages in the amplifiers. Probably one stage may be eliminated in a 3IF-stage set, but it is doubtful that any stage could be eliminated in a 2-stage set. One manufacturer estimated a total savings to the consumer of $10, another estimated $2 to $5. On a $140 receiver, the savings range from 1.5 to 7 percent.

British Rediffusion CATV and Television Receiver System†

The British system provides six television channels and six sound-only (FM) channels. The distribution cable consists of six pairs of wires for the television channels and six pairs of wires for the sound-only programming. The television conductors are larger than the FM conductors. These wires are encased within a single sheath which is shielded against external interference. A single cable is distributed throughout the service area, and 12 pairs of wires are connected to the subscribers television set. The set can also be used as an FM radio. (See Figure D-4.)

---

*These views on cost saving were obtained by design and product engineers at RCA, Motorola and Zenith. These companies have given little thought to simplification of set design to receive signals distributed by wire.

†Gabriel, R.P., A Comparison of Wired and Wireless Broadcasting for the Future. London: Rediffusion International Limited. June 1968

Obviously the set does not need a tuner for selection of channels. Selection is accomplished by a simple switch which connects the amplifier to the pair carrying the desired program. The cost figures given in the rediffusion system report indicate the substitution of this selector switch for the tuner and the elimination of the sound receiver section of the set will result in a cost reduction of 30 percent over the regular over-the-air receiver. One question might be considered on price and distribution comparisons between the regular and rediffusion system receiver. If a subscriber buys a rediffusion set, he must be connected onto the cable. Might the price markup of the special set be reduced to attract people to subscribe to the rediffusion system? This system can

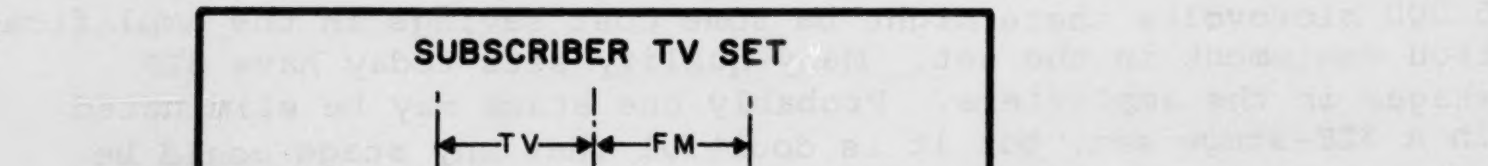

SUBSCRIBER TV SET
TV
FM
SELECTOR SWITCH
CENTRAL CONTROL STATION HEAD END ANTENNA
DROP CABLE
TV PAIR
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
CHANNEL 5
CHANNEL 6
TV AUDIO AND VIDEO
TO NEXT SUBSCRIBER
FM 1
FM 2
FM 3
FM 4
FM 5
FM 6
FM AUDIO
SINGLE MAIN LINE CABLE
FM PAIR

Figure D-4. Wiring Detail for Connecting Special Television Receiver to British Rediffusion System be made compatible with regular receivers by the inline insertion of an inverter, a device which changes the cable frequency to a frequency compatible with a certain channel on a regular television receiver.

The rediffusion system is different from the CATV system used in the United States. Under the British method, 20-channel diversity would necessitate a cable containing 20 large pairs in a single sheath. The diameter of the 12-pair British cable is not given in the report; however, a photograph of the cable shown on a pole line indicates that the diagram of the cable in the report may be drawn to scale. If this is true, its diameter measures 2-1/16 inch. A 20-pair cable would be considerably larger. This compares with CATV systems in the United States which use 1/2-inch to 3/4-inch diameter cable. The rediffusion report estimates that it would be better to build a one-way switched system (such as previously described), i.e., run one individual pair from the studio to each subscriber rather than have an 18-channel rediffusion system, since in a community of 240 subscribers the total pair footage would be about equal. However, in a large city a one-way switched system would be prohibited by the problem of cable size. (See discussion of Switched Systems in this report.) An additional cable would be required for hooking up a second set in each household.

Conclusion

Because of the large amount of cable required to provide 20 channels of television in the rediffusion system, the United States system (using a single coaxial cable) seems to be more practical. Here cost reduction on the standard receiver might be expected to average $6 per set. To this figure, we can add the average costs of a UHF and VHF antenna. Table 4 summarizes the total savings.

SWITCHED TWO-WAY COAXIAL CABLE SYSTEM

This is the most sophisticated and complete system being considered in this study. (See Figure D-5.) Basically, it offers switched broad band* input and switched broad band output to each subscriber. The system is priced in the Complan study.† Two separate coaxial

---

*In this study, broad band is 4 to $6MH_Z$ service capable of carrying a 525-line TV picture and 30 frames per second.

†Complan Associates, Inc., op. cit.

Table 4
Savings on Standard TV Receivers

Sets With Outside Antennas		Portable Sets With Built-in Antennas		Sets With Inside Antennas	
Set savings	$ 6	Set savings	$ 6	Set savings	$ 6
Avg. Outside antenna installed	39*	Avg. cost portable antenna system	7*	Avg. cost inside antenna	9†
	$45		$13		$15

---

*Telephone interview with Mr. Camron Duncan, Radio Corporation of America, Consumer Electronics Division, Indianapolis, Indiana.
†Allied Radio, Catalog 270, 1968.

cables and one control pair to each subscriber's home would be needed. One coaxial cable would provide the TV program, or other input, and the other cable would provide the picture output from the home. Amplifiers would be needed along the cable routes between the local switching office and the subscriber. The input coaxial cable would offer color reception, but a color camera would be required in each home for color output. This would add about $250 per month to the subscriber costs as covered in the Complan report.

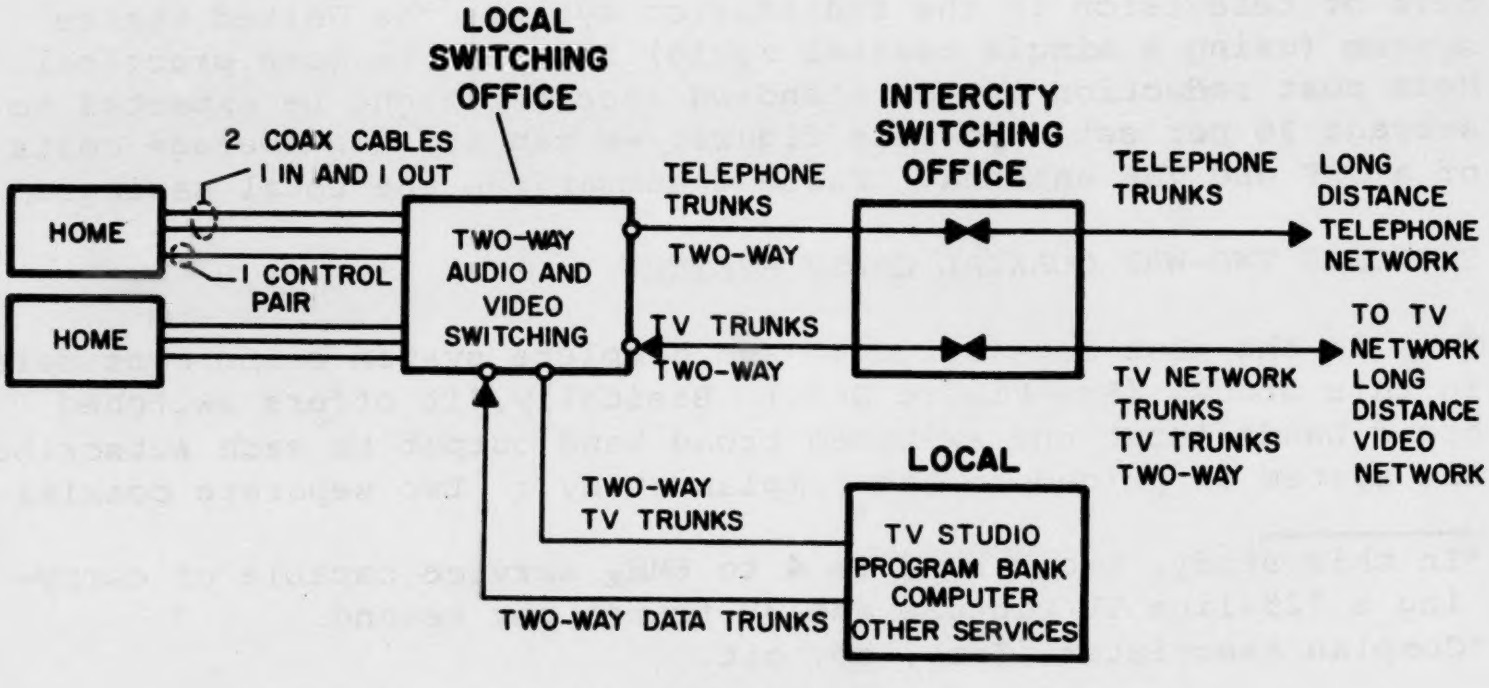

LOCAL SWITCHING OFFICE
INTERCITY SWITCHING OFFICE
2 COAX CABLES
1 IN AND 1 OUT
HOME
1 CONTROL PAIR
HOME
TWO-WAY AUDIO AND VIDEO SWITCHING
TELEPHONE TRUNKS
TWO-WAY
TV TRUNKS
TWO-WAY
TELEPHONE TRUNKS
LONG DISTANCE TELEPHONE NETWORK
TO TV NETWORK LONG DISTANCE VIDEO NETWORK
TV NETWORK TRUNKS
TV TRUNKS TWO-WAY
LOCAL
TWO-WAY TV TRUNKS
TV STUDIO
PROGRAM BANK
COMPUTER
OTHER SERVICES
TWO-WAY DATA TRUNKS

Figure D-5. General Layout Switched Two-way Coaxial Cable System

Practicality of the System

Telephone companies have analogous systems for voice circuits where one pair of wires is run from the central office to each home having a single party line. Presently the size of each telephone conductor varies from 0.0359-inch diameter, 19 gauge (used in long loops) to 0.0159-inch diameter, 26 gauge (used in short loops, generally in cities). A 2,700-pair, 26 gauge cable (1,800 straight lines) is 2.98 inches in diameter. A major feeder route in a city may consist of several cables totaling thousands of pairs.

Coaxial cable, used in present CATV systems varies from 3/4-inch diameter for main feeder cable to about 1/4-inch diameter for the drop cable into the house. In the British rediffusion system, a single TV conductor (two required per channel) appears to be 1/4-inch diameter.* An 1,800-pair (3,600 conductor) cable made up of 1/4-inch coaxial cable conductors would be at least 17 feet in diameter. Existing underground ducts for telephone cables are three inches and four inches in diameter, with one duct for each underground cable. Because of the multitude of individual circuits required within a city, it becomes obvious that any TV distribution system requiring an individual coaxial cable from a local switching center to each subscriber would be impractical, if present coaxial cables are used, because of the lack of duct and pole space to accomodate such large cables. This would be the case regardless of the cost of the system. To make such cable systems practical, technological developments must bring the diameter of a coaxial conductor down to the approximate size of present-day telephone conductors.

Possible Uses of Such a System

This two-way switched broad band system has numerous possible uses. Some are:

Inputs

- Conventional television programs (local and/or network input). This system will transmit color programs into the home.

---

*Gabriel, R.P., op. cit.

- Market information such as New York Stock Exchange tape (network)
- Home newspapers and other facsimile (network or local)
- Video tape library with remote selection by subscriber (local input through pay TV)
- Video shopping service
- Credit and banking services
- Other information services

Outputs

- Audio and visual communication among all subscribers (Picturephone)
- Facsimile transmission from home, either via scope or printed reproduction
- Audio and/or visual responses to the last four inputs
- Pulse, blood pressure and other audio and visual information for remote medical diagnostic services
- Remote metering of electric, gas, and water meters

Advantages and Disadvantages

This system could offer maximum program diversity through the video tape library and conventional programming.

The principal disadvantage of such a system is that only one program or other video input could be seen by the subscriber at one time.

Although this system can offer many inputs to various members of the household, the fact that these services cannot be offered simultaneously without a second or third cable greatly restricts these benefits.

Costs

The costs of this system were taken from the Complan report and are over and above the costs of regular telephone service. The monthly charges per subscriber are shown in Table 5. Color output would cost an additional $250 per month.

SWITCHED ONE-WAY VIDEO CABLE WITH INFORMATION AND VIDEO BANKS*

This system is a modification of the two-way system. Basically it would provide a switched broad band input to each subscriber and a narrow band output utilizing a regular telephone pair. A separate coaxial cable and one telephone pair would connect each subscriber to the local switching office. The local switching office would switch the broad band input from various sources depending on the subscribers dialing instructions. If any of these inputs necessitated a response such as shopping via telephone, the response would be limited to narrow band, such as voice or dialed code through the telephone pair. Small size coaxial ca-

Table 5
Subscriber Charges

	Black and White Television Output				
Number of TV Locations	Local Tarriff Per Mo.	Toll Tarriff Per Mo.	Total Charges Per Mo.	Color Camera Per Mo.	Total Charges Per Mo. With Color Output
One Million	233	215	448	250	698
Ten Million	230	200	430	250	680
Fifty Million	175	185	360	250	610
One Hundred Million	135	185	320	250	570

Source: A Study of Distribution Methods for Telecommunications. Suffern, New York. Complan Associates, Inc., May 1968. These estimates by Complan assume that small size coaxial cable will be developed which will be approximately the same size of the present-day telephone conductors, thus making it physically practical to build cable routes.

---

*Gardner, John. "A Searching Look At The Hardware That Can Reshape TV Broadcasting," Television Magazine, September 1967.

ble would also have to be developed for this system before it would be practical to construct cable routes. (See Figure D-6.)

Possible Uses of Such a System

Inputs

- Conventional television programs (local and/or network input). This system will transmit color programs.
- Market information such as New York Stock Exchange tape (network)
- Home newspapers and other facsimile (network or local)
- Video tape library with remote selection by subscriber (input pay TV). This library may be located in another city from the subscriber. If a remote library is used the subscriber may incur toll charges.
- Video shopping services
- Credit and banking services
- Other information services

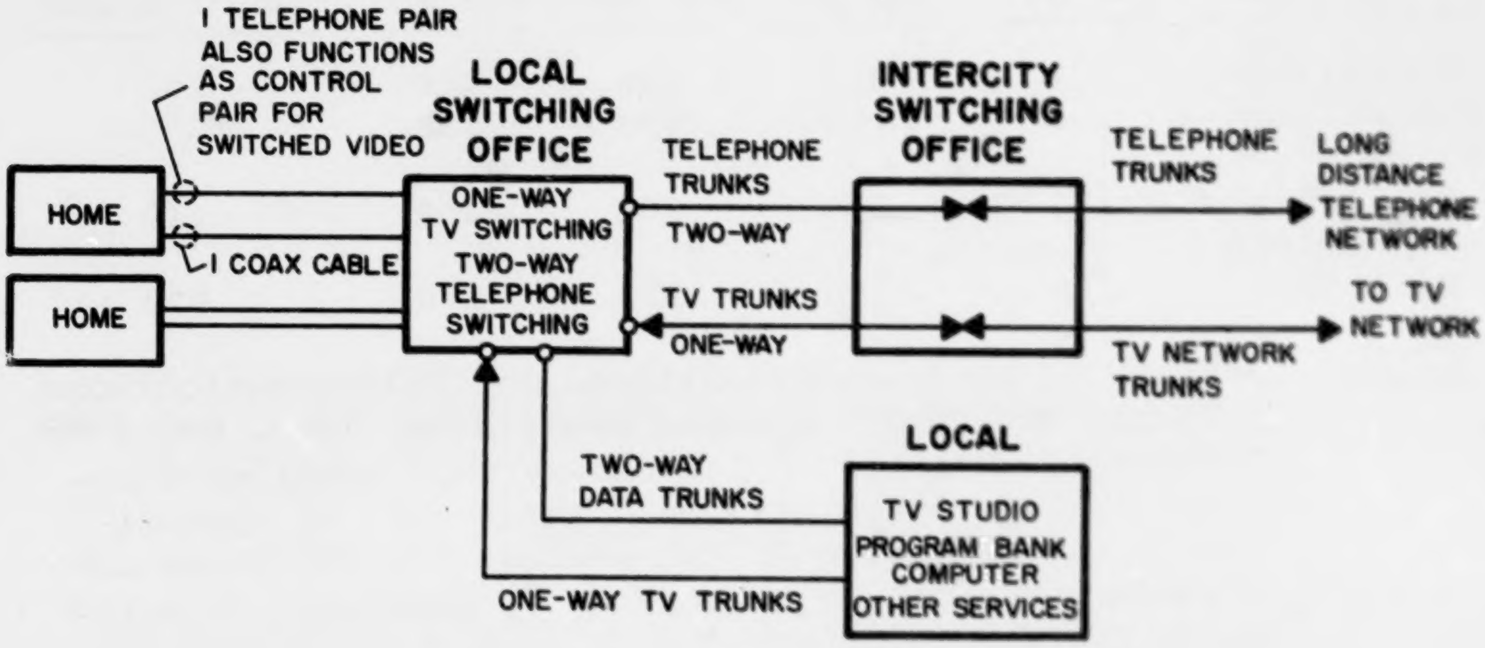

I TELEPHONE PAIR ALSO FUNCTIONS AS CONTROL PAIR FOR SWITCHED VIDEO
HOME
HOME
I COAX CABLE
LOCAL SWITCHING OFFICE
ONE-WAY TV SWITCHING TWO-WAY TELEPHONE SWITCHING
TELEPHONE TRUNKS
TWO-WAY
TV TRUNKS
ONE-WAY
INTERCITY SWITCHING OFFICE
TELEPHONE TRUNKS
LONG DISTANCE TELEPHONE NETWORK
TO TV NETWORK
TV NETWORK TRUNKS
TWO-WAY DATA TRUNKS
ONE-WAY TV TRUNKS
LOCAL
TV STUDIO
PROGRAM BANK
COMPUTER
OTHER SERVICES

Figure D-6. General Layout Switched One-way Video Cable System

Outputs

The system would still provide a narrow band response to program input via the majority of subscribers who have telephone service. These responses would be the same variety offered in the wired city system but with the addition of the custom service of selecting the program you wish to see by dialing the program library.

Thus, some future programming may require a verbal response over telephone but in other programs, such as shopping via television, the subscriber may dial the number and key in his order via his data set. This would provide ordering information to the salesman and cost information to the bank for debiting his account.

By using the telephone system the following outputs are possible:

- Audio communication among all subscribers (telephone)
- Facsimile transmission from home. Any video transmission would be much slower than a two-way system due to narrow band ouput. Video response might be used in certain cases such as medical diagnosis.
- Audio or data responses to the last four inputs

Costs

The costs of the system were estimated from cost figures supplied by the Complan report from the switched 4-6MH_z system.* The monthly charges per subscriber above regular telephone service, assuming one million locations, would be $250, including $140 local charges and $110 toll charges. Color transmission is included in these charges.

This system would still have the same disadvantages as the two-way system, i.e., only one program or other video input could be seen by the subscriber at one time. Like the two-way system, this switched system would offer maximum program diversity through program banks and other programming; and it would free the broadcast spectrum for other uses.

---

*Telephone interview with Mr. Charles Mapes, Complan Associates, Inc., Suffern, New York, June 26, 1968.

Appendix E

Consumer Time and Money Budgets

INTRODUCTION

Evaluation of the alternatives discussed in this report requires predicting consumer behavior with respect to television and other audio visual systems. One useful approach to this problem has been to realize that consumer decisions regarding recreation are made within certain constraints, which change very slowly through time.[*] Consumers tend to allocate constant proportions of their income to recreation, and the amount of money thus allocated must provide sufficient recreation to "fill up" their leisure time. A new activity generally competes with other activities for both a consumer's time and his money. For this reason, it is useful to examine how individuals allocate their time and money.

TIME BUDGETS

Several studies have been made about how people spend their time. These studies are of interest for two reasons: first, to determine whether leisure has been increasing, as is often claimed, and second, to estimate the use of media other than television.

Sebastian de Grazia has argued that declines in the work week during the past century have been nearly offset by increases in commuting time, shopping time, house and garden work, and moonlighting.[†]

John P. Robinson, of the Survey Research Center of the University of Michigan, compared time budgets of a sample of about 3,000 urban residents of the United States in 1965-1966 with the results of several earlier studies.[‡] Three of his comparisons are given below (See Tables E-1, E-2, and E-3).

In examining these tables, it should be noted that the Lundberg *et al* study is of a single affluent area in Westchester County,

---

[*] Dimling, J. and Porter, R., "Predicting Demand for Consumer Recreation Items." Paper presented at Operations Research Society of America - The Institute of Management Sciences Meeting. San Francisco. 1968.

[†] de Grazia, Sebastian. *Of Time, Work, and Leisure*. Anchor Books edition 1964. pp. 57 to 83.

[‡] Robinson, John P. "Social Change as Measured by Time Budgets." Paper presented at the meeting of the American Sociological Association. 1967.

New York, and is compared with 1965 data from only one city, Jackson, Michigan. The J. A. Ward study includes only 176 Bostonians. Moreover, the 1965-1966 data are preliminary, and may be corrected when the study is published by the University of Michigan.

The Lundberg et al study shows an overall decline in leisure time when compared with the Michigan study, and declines in every leisure activity except television viewing and miscellaneous. Time spent working for pay increased for men but decreased for women, while time spent sleeping declined for everyone.

Comparison with Sorokin and Berger data indicates a slight increase in time spent working since 1935. But when work is combined with the physiological needs category, the time remaining for other activities increased from 5.7 hours per day to 6.4. Unfortunately, no categories for shopping, commuting, and other nonleisure "free time" activities were included in the Sorokin and Berger study.

Table E-2 shows an increase in time spent by men on all leisure activities since 1954 of one-half hour per day. Yet time spent at work and traveling (presumably much of the travel time was spent on the journey to and from work) increased slightly. In fact, all other nonleisure activities except miscellaneous work at home and eating increased for men. The net increase for all activities except sleep was 1.3 hours per day for men. Thus, it appears that leisure has not been substituted for work, but for sleep.

In summary then, it appears that free time has not been increasing, at least during the past 30 years, and probably would have been decreasing were it not for reductions in time spent sleeping and eating. Despite the promise (or warning) that automation will eliminate the necessity for most people to work, it appears that, for the next 20 or 30 years at least, automation's effect will be to substitute higher level jobs for lower. Of course, certain groups, notably the aged, have more leisure time than others, and to the extent that their proportion of the population increases, average free time will increase. The Bureau of the Census has made a series of projections of the population of the United States to 1990.* No significant increase in the proportion of

---

*Current Population Reports, Series P-25, No. 381, "Projections of the Population of the United States by Age, Sex, and Color to 1990, With Extensions of Population by Age and Sex to 2015". U. S. Department of Commerce, Bureau of the Census. Washington: U. S. Government Printing Office. 1965. p. 66.

Table E-1

Comparison of Budget Average for Various Groups in Lundberg et al[a] (1934) With Similar Groups of the 1965-1966 Study (in Parenthesis)

	MEN			EMPLOYED WOMEN		HOUSEWIVES	OVERALL
Nonleisure (Hours per Day)	Executives Professional	White Collar	Labor	White Collar	Labor		
Sleep	8.2 (7.7)	8.3 (7.6)	9.0 (7.4)	8.2 (7.6)	8.3 (7.4)	8.6 (7.5)	8.4 (7.5)
Work for Pay	6.2 (6.8)	6.4 (7.2)	5.9 (7.5)	5.9 (5.4)	6.7 (3.9)	0.1 (0.2)	4.5 (4.5)
Care of Self	0.7 (0.9)	0.7 (1.0)	0.8 (1.3)	1.0 (1.3)	1.0 (1.3)	1.0 (1.3)	0.9 (1.2)
Transportation	1.2 (1.6)	0.8 (1.5)	0.9 (1.3)	1.1 (1.3)	1.0 (1.3)	0.8 (1.0)	1.0 (1.3)
Household and Children	0.9 (0.7)	0.5 (0.6)	0.6 (0.3)	1.2 (2.9)	1.4 (2.9)	4.2 (6.2)	1.9 (2.8)
	17.2(17.7)	16.7(18.1)	17.2(17.8)	17.4(18.5)	18.4(16.8)	14.7(16.2)	16.7(17.3)
Shopping	- (0.4)	- (.03)	- (0.2)	- (0.5)	- (0.7)	- (0.7)	- (0.5)
Leisure Activities (Minutes per Day)							
Eating	106 (78)	114 (73)	101 (76)	116 (59)	109 (52)	106 (79)	108 (71)
Visiting	79 (68)	81 (74)	94 (39)	94 (74)	74(132)	151(138)	103 (95)
Reading	74 (50)	61 (36)	95 (24)	43 (29)	39 (23)	84 (40)	68 (35)
Entertainment	15 (11)	45 (13)	35 (13)	48 (14)	29 (16)	44 (10)	37 (12)
Sports	40 (10)	34 (12)	35 (5)	19 (5)	20 (0)	16 (2)	47 (10)
Radio	22 (5)	34 (4)	32 (10)	18 (5)	45 (7)	29 (2)	30 (5)
Motoring	15 (2)	20 (2)	12 (1)	25 (4)	13 (1)	10 (3)	15 (2)
Clubs	10 (5)	8 (8)	0 (5)	3 (7)	0 (5)	61 (12)	20 (8)
Television	- (80)	- (75)	-(159)	- (58)	-(102)	- (75)	- (89)
Miscellaneous	40 (51)	35 (51)	5 (24)	33 (61)	8 (64)	50 (65)	32 (54)
TOTAL LEISURE MINUTES	401(360)	438(348)	409(366)	399(306)	336(402)	551(426)	470(381)
TOTAL LEISURE HOURS	6.7(6.0)	7.3(518)	6.8(6.1)	6.6(5.1)	5.6(6.7)	9.2(7.1)	7.6(6.3)
TOTAL	23.9(24.1)	24.0(24.2)	24.0(24.1)	24.0(24.1)	24.0(24.2)	23.9(24.0)	24.3(24.1)

a. Lundberg, G., Komarovski, M., and McInery, M., Leisure: A Suburban Study (New York: Columbia University Press) 1934.

Source: This table first appeared in Robinson, John P., "Social Change as Measured by Time Budgets." Paper presented at the 1967 meetings of the American Sociological Association.

Table E-2

Comparison of 1954 J. A. Ward-Mutual Broadcasting Company Estimates* With Those of the 1965-1966 Study (In Parentheses)

Away from Home	Men	Women
At Work	6.0 (6.1)	1.5 (2.3)
Traveling	1.4 (1.6)	0.7 (1.1)
Shopping	0.1 (0.4)	0.4 (0.7)
Restaurant, bar, etc.	0.2 (0.4)	0.1 (0.2)
Friend/relatives home	0.7 (0.6)	1.0 (0.7)
Leisure (church, sports, etc.)	0.5 (1.0)	0.5 (0.6)
	8.9(10.1)	4.2 (5.6)
At Home		
Leisure (except reading)	2.4 (2.7)	2.8 (3.1)
Reading	0.9 (0.7)	0.8 (0.5)
Miscellaneous work at home	0.7 (0.5)	1.1 (1.1)
Household chores	0.2 (0.2)	2.7 (2.4)
Eating or preparing food	1.2 (1.1)	2.5 (2.2)
Dressing, bathing, etc.	0.6 (0.9)	0.9 (1.2)
Asleep	2.1 (7.8)	1.9 (7.9)
	8.1(13.9)	12.7(18.4)
Total	17.0†(24.1)	16.9†(24.0)
All leisure activities	4.5 (5.0)	5.1 (5.1)

*This study is described in deGrazia, op.cit. page 422 and 423

†The 17 hours total for the 1954 study is due to the fact that the period between 11 p. m. and 6 a. m. was not included.

Source: Se Table E-1

Table E-3
Comparison of 1935 Sorokin and Berger* Results with Those of the 1965-1966 Study

	1935 Hours	1965-1966 Hours
Physiological needs (eat, sleep, etc.)	11.2	10.3
Economic (work, chores)	7.1	7.3
Societal (visiting, clubs, etc.)	1.4	1.8
Religious	.1	.2
Intellectual (study, reading)	1.4	.9
Artistic (movies, artistic)	.4	.1
Love and courting	.1	--
Pleasurable (play, rides, etc.)	1.5	.7
Television	--	1.7
Other	.8	1.0
	24.0	24.0

*Sorokin, P. and Berger, C. Time-Budgets of Human Behavior. Cambridge, Massachusetts: Harvard University Press, 1939.

Source: See Table E-1

the population 65 and older is projected in any of the four series; one projection even shows a decline.

Data from a recent unpublished study conducted by the Survey Research Center are shown in Table E-4, which makes a distinction between engaging in an activity as a primary versus a secondary activity. These data show considerably lower estimates of television viewing time than might be expected from other reports of use of television, e.g., the June 7, 1968 report by A. C. Nielsen Company that the average home with a color set tunes 6.9 hours per day, and in the average home with a monochrome set, the set is on 5.9 hours per day.* There may be several reasons for the apparent discrepancy. First, TV sets are sometimes turned on although nobody is viewing the set; second, children's viewing is included in the Nielsen estimates; third, the Nielsen estimates include only households that have television sets. Table E-4 shows that television is used twice as much as a primary activity as radio and printed media.

---

*Broadcasting, June 10, 1968, p. 9.

Table E-4
Summary of University of Michigan Time Use Survey
Free Time Activities
(hours per day)

	Primary Time			Secondary Time			Total		
Activity	Men	Women	All	Men	Women	All	Men	Women	All
Resting	0.3	0.4	0.3	0.1	0.1	0.1	0.4	0.5	0.4
Education	0.3	0.1	0.2	--	--	--	0.3	0.1	0.2
Organizations	0.2	0.3	0.3	--	--	--	0.2	0.3	0.3
Radio	0.1	--	0.1	0.8	0.9	0.9	0.9	0.9	1.0
Television	1.7	1.4	1.5	0.4	0.8	0.6	2.1	2.2	2.1
Reading	0.7	0.5	0.6	0.3	0.2	0.3	1.0	0.7	0.9
Social Life	1.0	1.3	1.2	0.1	0.2	0.2	1.1	1.5	1.4
Conversation	0.2	0.4	0.3	3.1	2.2	2.6	3.3	2.6	2.9
Walking	--	--	--	--	--	--	--	--	--
Sports	0.2	0.1	0.1	--	--	--	0.2	0.1	0.1
Various Leisure	0.2	0.4	0.3	0.1	0.3	0.2	0.3	0.7	0.5
Amusements	0.2	0.1	0.1	--	--	--	0.2	0.1	0.1
TOTAL*	5.0	5.1	5.1	5.0	4.8	4.9	10.0	9.9	10.0

*Columns may not add to total due to rounding
No entry indicates less than three minutes per day

Source: Unpublished data (subject to correction) from the Survey Research Center of the University of Michigan

Consumer Recreation Expenditures

For the last 40 years, consumer expenditures on recreation have remained fairly constant as a fraction of total personal consumption expenditures. Table E-5 shows that spending on recreation has ranged between 5 percent and 6 percent of personal consumption expenditures since 1937, so that new entertainment or recreation activities must displace other activities in the consumer's recreation budget. Furthermore, there is a striking consistency in the pattern of spending for items that might be classified as television substitutable--activities that involve watching or reading, rather than participating. Figure E-1 shows expenditures on items of this type and the total for all such items. A slight, but consistent downward drift is apparent in the total, and the pattern is strong enough to suggest that new video-audio systems, e.g., video records, or pay TV, would obtain financial support only to the extent that spending in these five categories was reduced.

Table E-5
Recreation Spending

Year	Recreation Expenditures as Percentage of Personal Consumption Expenditures	Year	Recreation Expenditures as Percentage of Personal Consumption Expenditures
1929	5.61%	1942	5.28%
1930	5.71	1943	4.99
1931	5.46	1944	5.01
1932	5.02	1945	5.13
1933	4.81	1946	5.95
1934	4.76	1947	5.76
1935	4.72	1948	5.58
1936	4.88	1949	5.66
1937	5.08	1950	5.84
1938	5.07	1951	5.61
1939	5.16	1952	5.58
1940	5.31	1953	5.53
1941	5.26	1954	5.53
1955	5.53	1961	5.82
1956	5.62	1962	5.77
1957	5.45	1963	5.92
1958	5.45	1964	6.12
1959	5.58	1965	6.10
1960	5.62		

Source: Calculated from The National Income and Product Accounts of the United States, 1929-65. U. S. Department of Commerce. August 1966.

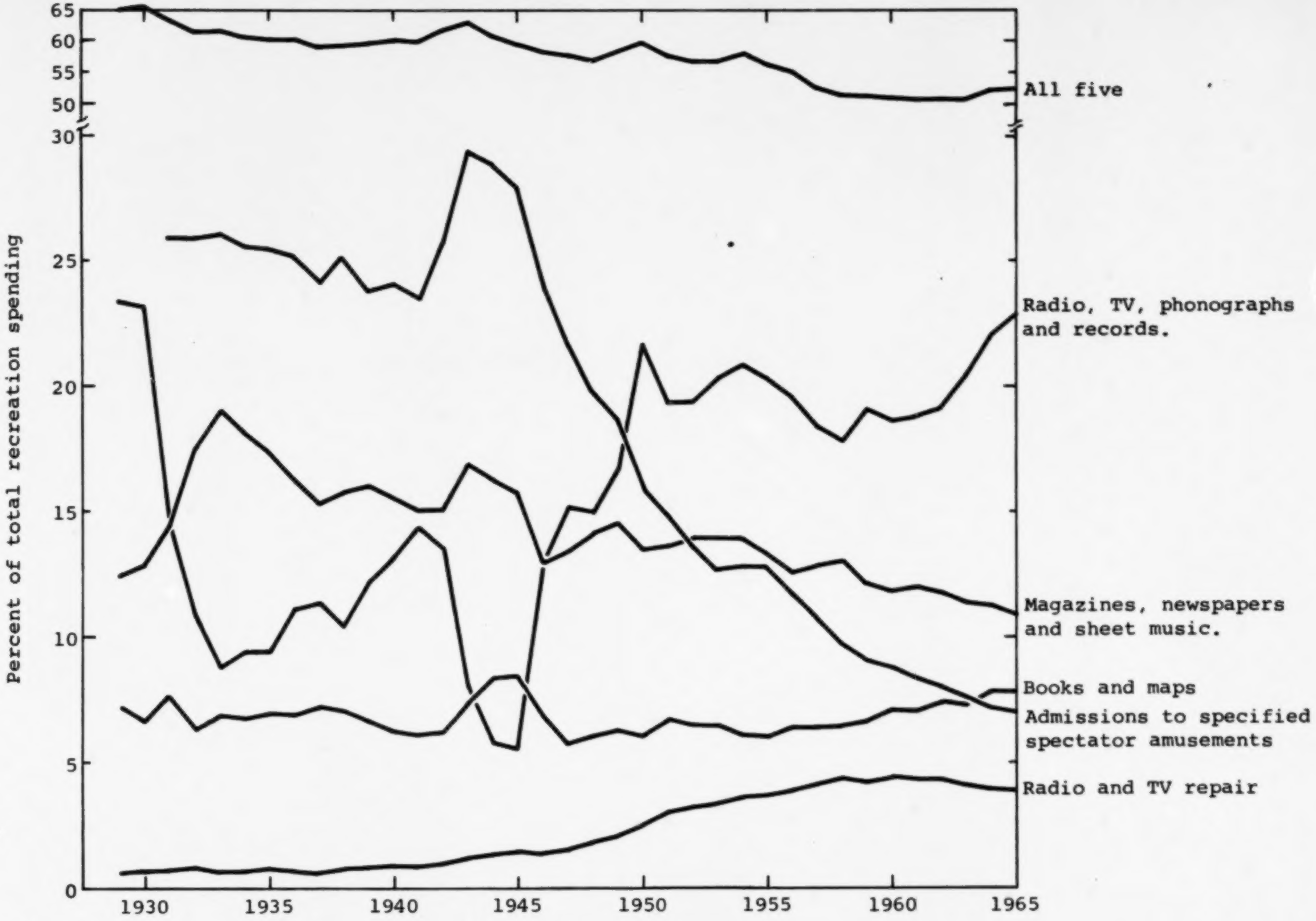


Figure 1. Percent of Recreation Spending on Specific Classes of Goods and Services

Appendix F

Program Cost Information

Table F-1
Program Costs--Examples

Program type	Number and length of programs	Creative	Technical	Facilities	Materials	Talent	Total current below the line cost	Projected below the line cost (1978)	Total current cost per program
Game Show	5-½hr/wk	$ 1,238	$ 5,068	$ 7,734	$ 257	$ 16,000	$ 14,297	$ 18,580	$ 6,060
Game Quiz	5-½hr/wk	2,073	8,464	13,565	365	CNA	24,467	31,807	---
Game Show	5-½hr/wk	2,425	10,086	15,474	503	CNA	28,488	37,034	---
Interview--Host and Participants	5-½hr/wk	216	3,674	4,976	24	CNA	8,890	11,557	---
Variety--Extravaganza	1 hr/wk	12,984	16,146	23,875	995	99,000	54,000	70,200	153,000
Variety--MC, live Orchestra and VIP guest performers	5-1½hr/wk	7,719	10,220	17,303	62	85,000	35,304	46,000	25,061
Quasi Variety--Host, Orchestra, VIP guests	5-1½hr/wk	9,609	12,817	21,492	77	CNA	43,995	57,194	---
Serial Episode	5-½hr/wk	1,377	10,526	11,976	785	18,000	24,664	32,180	4,266
Serial Episode	5-½hr/wk	1,799	15,088	16,990	1,875	21,000	35,752	46,478	5,675
Sports, Basketball	Game time	240	880	770	25	---	1,890	2,457	---
News	5-½hr/wk	8	50	76	---	CNA	134	174	---
Instructional (ETV)	15-20 min. segments with 1½ hr. intro.	7,700	13,240	13,020	15,140	2,100	49,100	68,830	---
Weekly Variety Specific Culture in Different Countries (ETV)	8-1 hr. segments	22,720	23,728	17,200	9,751	800	73,399	95,419	9,275
Drama (ETV)	90 minutes	26,475	46,315	62,560	6,795	17,327	142,145	184,789	159,472
Interview--Host and Author (ETV)	1 hour	5,617	2,935	7,900	1,259	1,580	17,711	23,024	19,291
Film Documentary (ETV)	½ hour	4,075	3,100	220	3,000	---	10,395	13,514	---
Variety State Show at Night Club	1 hour	180	2,700	5,000	---	CNA	7,880	10,244	---
Situation Comedy	½ hour	600	9,380	4,940	5,300	CNA	20,220	26,286	---

CNA = Cost Not Available
Source: Richard Heffner Associates

TABLE F-2
REPRESENTATIVE COSTS FOR CONTRACT PROGRAMMING

Column		1	2	3	4	5	6	7	8	9	10	11
		Running Time Hr	Number Per Year	Hours Per Year	Crew and Facilities ($000)	Producer Team ($000)	Talent etc. ($000)	Program Supplies ($000)	Overhead ($000)	Total ($000)	Cost Per Hour ($000)	Total Annual Cost Per Program Category ($000)
Drama 1-hr	(L)	1	13	13	9	14	40	20	17	100	100	1,300
Drama 2-hr	(L)	2	13	26	14	21	60	30	25	150	75	1,950
Serial drama	(F)	1/2	260	130	1	4	4	3	2.5	14.5	29	3,710[1]
Light entertainment	(L)	1	26	26	6	9	17	10	8	50	50	1,300
Children	(F)	1	130	130	1	8	6	10	5	30	30	3,900
Adult education	(L/F)	1	16	16	3	10	6	6	5	30	30	480
Science documentaries	(F)	1/2	52	26	1	6	4	6	3	20	40	1,040
Historical documentaries	(F)	1	12	12	3	22	10	19	11	65	65	780
Humanities documentaries	(F)	1	12	12	2	16	7	13	7	45	45	540
Travel documentaries	(F)	1	12	12	2	16	7	17	8	50	50	600
Public affairs documentaries												
Low cost-1/2 hr (F)		1/2	26	13	1	4	3	5	2	15	30	390
Medium cost-1/2 hr (F)		1/2	26	13	1	8	5	11	5	30	60	780
High cost-1/2 hr (F)		1/2	26	13	2	16	6	14	7	45	90	1,170
Low cost-1-hr (F)		1	26	26	2	12	5	10	6	35	35	910
Medium cost-1-hr (F)		1	26	26	3	24	10	21	12	70	70	1,820
High cost-1-hr (F)		1	26	26	5	36	14	32	18	105	105	2,730
				520						Total annual cost ($000)		23,400

(L) Live/Tape Production

(F) Film Production

---

[1] Adjusted slightly to round total.

Source: Richard Heffner Associates.

Table F-3

Comparative Cost Analysis for Television Facilities Using Two Live Cameras, Two Film Chains and Two Video Tape Machines

Quantity	Equipment Description	Color	Monochrome (standard)	Monochrome (minimal)	CATV
2	Image orthicon cameras with pedestal, cradle head, cable, etc.	---	$ 44,570	$ 39,000	
2	Plumbicon cameras with pedestal, cradle head, cable, etc.	$148,590	---	---	
2	Monochrome vidicon cameras with pedestal pan head, cable, etc.	---	---	---	$7,000
2	Film chains, each with: 1 camera 1 16mm projector 1 35mm slide projector 1 multiplexer 1 set of tubes 1 splicer 1 rewind 1 lens system 1 set of hardware	135,525	33,558	19,878	9,440
2	Monochrome Tape Recorder	---	157,000	118,000	6,000
2	Color Video Tape Recorder	209,000	---	---	---
1	Set lighting equipment	30,000	30,000	16,500	500
1	Set monitoring and waveform equipment	26,000	30,000	13,000	3,000
1	Video switching system	27,620	17,000	12,000	2,000
1	Effects generator	included above	3,000	---	---

Table F-3 (continued)

Quantity	Equipment Description	Color	Monochrome (standard)	Monochrome (minimal)	CATV
2	Sync generators with change over switching	3,200	3,000	2,000	1,200
1	Pulse distribution system	10,000	3,000	2,500	---
1	Video distribution system	10,000	3,000	2,500	500
1	Video Jack field	7,500	5,100	3,000	500
1	Processing amplifier	1,500	1,500	1,500	---
1	Audio equipment system	3,600	3,600	1,500	600
1	Audio distribution system	2,650	2,650	1,000	---
1	Turntable system	600	600	400	150
1	Audio tape system	2,000	2,000	1,000	500
1	Audio tape cartridge system	1,500	1,500	1,000	---
1	Audio Jack field	1,200	1,200	1,200	---
1	Set microphones	2,000	2,000	1,000	300
1	Set microphone stands	700	700	150	50
1	Speaker system	600	600	300	100
1	Studio announce system	150	150	150	---
1	Intercommunication system	1,000	1,000	1,000	---
1	Set consoles and cabinets	4,000	4,000	3,000	500
1	CATV modulator	---	---	---	1,500
		$628,935	$350,728	$241,578	$33,840

Source: Richard Heffner Associates

Appendix G

TV Channel Allocation and Usage

Table G-1
TV Channel Allocation and Usage

ARB Rank	Market	COMMERCIAL										NONCOMMERCIAL									
		Channels Allocated		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels		Channels Reserved		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
1	New York (Linden, New Brunswick, Newark, N.J.)	a/6	a/2	6	1	-	-	-	1	-	-	a/1	a/3	a/1	a/2	-	1	-	-	-	1
2	Los Angeles (Corona, San Bernardino, Riverside, Fontana & Guasti)	7	7	7	4	-	3	-	-	-	-	1	3	-	2	-	-	-	1	-	-
3	Chicago (Aurora, Elgin, Joliet, Gary, & Hammond, Ind.)	4	9	4	2	-	6	-	1	-	-	1	2	1	2	-	-	-	-	-	-
4	Philadelphia (Burlington, N.J. & Wilmington, Del.)	b/3	5	3	3	-	1	-	1	-	-	b/1	2	b/1	1	-	-	-	-	-	1
5	Boston	3	4	3	2	-	1	-	1	-	-	1	1	1	1	-	-	-	-	-	-
6	Detroit	3	3	3	1	-	2	1	1	1	1	-	1	-	1	-	-	-	-	-	-
7	San Francisco-Oakland	4	5	4	2	-	2	-	1	-	-	1	1	1	1	-	-	-	-	-	-
8	Cleveland (Lorain)	3	3	3	1	-	2	-	-	-	-	-	1	-	1	-	-	-	-	-	-
9	Washington	4	3	4	2	-	1	-	-	-	-	-	2	-	1	-	1	-	-	-	-
10	Pittsburgh	3	2	3	-	-	2	-	-	-	-	1	1	1	1	-	-	-	-	-	-
11	Baltimore	3	3	3	1	-	1	-	1	-	-	-	1	-	-	-	1	-	-	-	-
12	St. Louis	4	2	4	-	-	2	-	-	-	-	1	1	1	-	-	-	-	-	-	1
13	Hartford-New Haven-New Britain (Waterbury)	2	5	2	3	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
14	Providence (New Bedford, Mass.)	3	3	3	-	-	1	-	-	-	2	-	2	-	1	-	-	-	-	-	1
15	Dallas-Fort Worth (Richardson)	4	c/4	4	3	-	1	-	-	-	-	1	c/2	1	c/1	-	-	-	-	-	1
16	Cincinnati	3	2	3	-	-	1	-	1	-	-	-	1	-	1	-	-	-	-	-	-
17	Minneapolis-St. Paul	4	2	4	-	-	1	-	1	-	-	1	1	1	1	-	-	-	-	-	-
18	Indianapolis (Bloomington)	4	3	4	-	-	1	-	1	-	1	-	3	-	-	-	1	-	1	-	1
19	Atlanta	3	3	3	1	-	1	-	1	-	-	-	2	-	1	-	-	-	-	-	1
20	Miami	4	4	4	1	-	1	-	1	-	1	1	1	1	1	-	-	-	-	-	-
21	Buffalo	3	d/2	3	-	-	2	-	-	-	-	-	d/2	1	d/1	-	1	-	-	-	-
22	Seattle-Tacoma	5	2	5	-	-	1	-	1	-	-	1	3	1	2	-	-	-	-	-	1
23	Kansas City, Mo.	3	3	3	-	-	3	-	-	-	-	-	2	-	1	-	-	-	-	-	1
24	Milwaukee	3	3	3	1	-	1	-	-	-	1	1	1	1	1	-	-	-	-	-	-
25	Sacramento-Stockton	3	4	3	-	-	2	-	2	-	-	1	-	1	-	-	-	-	-	-	-
26	Houston (Galveston, Rosenberg)	3	5	3	1	-	3	-	1	-	-	1	2	1	-	-	-	-	2	-	-
27	Dayton	2	2	2	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
28	Columbus, Ohio	3	1	3	-	-	1	-	-	-	-	-	2	-	1	-	-	-	-	-	1
29	Johnstown-Altoona	2	3	2	1	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
30	Harrisburg-Lancaster-Lebanon-York	1	6	1	4	-	-	-	1	-	1	-	1	-	1	-	-	-	-	-	-
31	Tampa-St. Petersburg (Clearwater)	3	4	3	1	-	3	-	-	-	-	1	1	1	1	-	-	-	-	-	-
32	Memphis	3	2	3	-	-	2	-	-	-	-	1	1	1	-	-	-	-	-	-	1
33	Charlotte, N.C.	2	2	2	2	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
34	Syracuse, N.Y.	3	2	3	-	-	1	-	-	-	1	-	1	-	1	-	-	-	-	-	-
35	Toledo	2	3	2	1	-	1	-	1	-	-	-	1	-	1	-	-	-	-	-	-
36	Portland, Ore.	4	1	4	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1
37	Wheeling-Steubenville	2	2	2	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
38	Grand Rapids-Kalamazoo (Battle Creek)	3	2	3	-	-	1	-	-	-	1	-	2	-	-	-	-	-	-	-	2

Table G-1

TV Channel Allocation and Usage (cont'd.)

ARB Rank	Market	COMMERCIAL										NONCOMMERCIAL									
		Channels Allocated		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels		Channels Reserved		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
39	Denver (Boulder)	4	3	4	-	-	2	-	1	-	-	2	1	1	-	-	-	-	-	1	1
40	Birmingham	2	3	2	1	-	1	-	1	-	-	1	1	1	-	-	-	-	-	-	1
41	Nashville	3	2	3	-	-	2	-	-	-	-	1	1	1	-	-	-	-	-	-	1
42	Albany-Schenectady-Troy(Amsterdam)	3	3	3	-	-	2	-	-	-	1	-	3	-	-	-	1	-	-	-	2
43	New Orleans	3	3	3	1	-	1	-	-	-	1	1	1	1	-	-	-	-	-	-	1
44	Greenville-Spartanburg, S.C.-Asheville, N.C.	3	4	3	1	-	-	-	-	-	3	-	2	-	2	-	-	-	-	-	-
45	Greensboro-Winston Salem-High Point	3	3	3	1	-	-	-	1	-	1	-	2	-	-	-	-	-	-	-	2
46	Flint-Saginaw-Bay City	2	4	2	1	-	-	-	1	-	2	-	2	-	1	-	-	-	-	-	1
47	Louisville	2	3	2	1	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
48	Charleston-Huntington(Berkley, W.Va.-Ashland, Ky.)	4	3	4	-	-	1	-	-	-	2	-	3	-	-	-	2	-	-	-	1
49	Lansing (East Lansing, Parma)	e/2	3	2	-	-	-	-	-	-	3	e/-	1	e/-	-	-	-	-	-	-	1
50	San Diego	2	2	2	1	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-
51	Oklahoma City	3	f/3	3	-	-	1	-	-	-	2	1	f/1	1	f/1	-	-	-	-	-	-
52	Raleigh-Durham	2	2	2	-	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	1
53	Norfolk-Portsmouth-Newport News-Hampton	3	3	3	1	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
54	Manchester, N.H.	1	2	1	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-
55	Omaha	3	2	3	-	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-	1
56	Wich ta-Hutchinson	3	3	3	-	-	1	-	-	-	2	1	2	-	-	-	-	1	-	-	2
57	San Antonio	3	2	3	1	-	1	-	-	-	-	1	1	1	-	-	-	-	-	-	1
58	Tulsa	3	3	3	-	-	3	-	-	-	-	1	1	1	-	-	-	-	-	-	1
59	Salt Lake City-Ogden-Provo	3	5	3	-	-	-	-	1	-	4	3	2	3	1	-	-	-	-	-	1
60	Salinas-Monterey	1	2	1	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
61	Phoenix (Mesa)	4	3	4	1	-	2	-	-	-	-	1	1	1	-	-	-	-	-	-	1
62	Davenport-Rock Island-Moline	3	2	3	-	-	1	-	-	-	1	-	2	-	-	-	-	-	-	-	2
63	Portland-Poland, Me.	3	2	3	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
64	Rochester	3	2	3	-	-	1	-	-	-	1	-	1	-	1	-	-	-	-	-	-
65	Orlando-Daytona Beach	3	2	3	-	-	1	-	-	-	1	-	1	-	1	-	-	-	-	-	-
66	Richmond (Petersburg)	3	2	3	-	-	1	-	-	-	1	-	2	-	2	-	-	-	-	-	-
67	Roanoke-Lynchburg	3	2	3	1	-	-	-	-	-	1	-	2	-	1	-	-	-	-	-	1
68	Shrevesport, La.(Texarkana, Texas)	3	2	3	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	2
69	Wilkes Barre-Scranton	-	5	-	3	-	-	-	-	-	2	-	1	-	1	-	-	-	-	-	-
70	Green Bay	3	1	3	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-
71	Little Rock	3	1	3	-	-	1	-	-	-	-	1	1	1	-	-	-	-	-	-	1
72	Champaign-Decatur-Springfield (Danville, Urbana)	1	8	1	3	-	1	-	-	-	4	1	1	1	-	-	-	-	-	-	1
73	Mobile, Ala.-Pensacola, Fla.	3	4	3	-	-	-	-	-	-	4	-	3	-	2	-	-	-	-	-	1
74	Cedar Rapids-Waterloo	3	2	3	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
75	Jacksonville	2	3	2	1	-	1	-	-	-	1	1	1	1	-	-	-	-	-	-	1
76	Spokane	3	2	3	-	-	-	-	-	-	2	1	-	1	-	-	-	-	-	-	-

Table G-1
TV Channel Allocation and Usage (cont'd.)

ARB Rank	Market	COMMERCIAL Channels Allocated V	COMMERCIAL Channels Allocated U	COMMERCIAL Stns. on the Air V	COMMERCIAL Stns. on the Air U	COMMERCIAL Auth.Stns. Not on the Air V	COMMERCIAL Auth.Stns. Not on the Air U	COMMERCIAL Channels Applied For V	COMMERCIAL Channels Applied For U	COMMERCIAL Available Channels V	COMMERCIAL Available Channels U	NONCOMMERCIAL Channels Reserved V	NONCOMMERCIAL Channels Reserved U	NONCOMMERCIAL Stns. on the Air V	NONCOMMERCIAL Stns. on the Air U	NONCOMMERCIAL Auth.Stns. Not on the Air V	NONCOMMERCIAL Auth.Stns. Not on the Air U	NONCOMMERCIAL Channels Applied For V	NONCOMMERCIAL Channels Applied For U	NONCOMMERCIAL Available Channels V	NONCOMMERCIAL Available Channels U
77	Knoxville	2	2	2	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
78	Des Moines (Ames)	3	4	3	-	-	2	-	-	-	2	1	2	1	-	-	-	-	-	-	2
79	Jackson, Miss.	3	2	3	-	-	2	-	-	-	-	-	1	-	-	-	1	-	-	-	-
80	Cape Girardeau, Mo.-Paducah, Ky.-Harrisburg, Ill.	3	2	3	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
81	Columbus, Ga.	2	2	2	-	-	2	-	-	-	-	-	1	-	1	-	-	-	-	-	-
82	Youngstown	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
83	Columbia, S.C.	1	3	1	2	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	1
84	Baton Rouge	2	1	2	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1
85	Springfield-Holyoke	-	2	-	2	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-
86	Greenville-Washington-New Bern, N.C.	3	1	3	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
87	Binghamton	1	2	1	2	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-
88	Madison	1	3	1	2	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-
89	Lincoln-Hastings-Kearney (Albion)	4	2	4	-	-	-	-	-	-	2	1	2	1	-	-	-	-	1	-	1
90	Fresno (Hanford, Visalia)	-	6	-	5	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-
91	Chattanooga	3	1	3	-	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-	-
92	Evansville	1	3	1	2	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
93	Sioux Falls	2	2	2	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
94	South Bend-Elkhart	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
95	West Palm Beach	2	2	2	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	1
96	Ft. Wayne	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
97	Rockford, Ill. (Freeport)	1	3	1	2	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
98	Peoria, Ill.	-	4	-	3	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
99	Augusta	2	2	2	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-
100	Terre Haute	2	1	2	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	1
101	Monroe, La.-El Dorado, Ark.	2	3	2	-	-	-	-	-	-	3	1	1	-	-	-	-	-	-	1	1
102	Bristol, Va.-Johnson City, Tenn.	2	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
103	Albuquerque, N.M.	3	2	3	-	-	-	-	-	-	2	1	1	1	-	-	-	-	-	-	1
104	Sioux City, Iowa	2	1	2	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
105	Beaumont-Port Arthur, Tex.	3	1	3	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
106	Austin-Rochester, Minn.-Mason City, Ia.	3	1	3	-	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	2
107	Erie, Pa.	1	3	1	3	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
108	Albany, Ga.	1	2	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
109	Springfield, Mo.	2	1	2	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1
110	Burlington, Vt.-Plattsburgh, N.Y.	2	1	2	-	-	1	-	-	-	-	-	2	-	1	-	-	-	-	-	1
111	Utica, N.Y.	2	2	1	-	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-	1
112	Montgomery, Ala.	1	2	1	2	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
113	Lafayette, La.	2	1	2	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1
114	Hawaii (includes 4 Islands)	14	10	10	-	-	-	-	1	4	9	4	8	2	-	-	-	-	-	2	8
115	Duluth, Minn.-Superior, Wisc.	3	3	3	-	-	-	-	-	-	3	1	-	1	-	-	-	-	-	-	-
116	Joplin, Mo.-Pittsburg, Kan.	2	1	2	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
117	Waco-Temple, Tex.	2	3	2	-	-	1	-	-	-	2	-	1	-	-	-	-	-	-	-	1
118	Amarillo, Tex.	3	13	3	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	1	-

Table G-1
TV Channel Allocation and Usage (cont'd.)

ARB Rank	Market	COMMERCIAL										NONCOMMERCIAL									
		Channels Allocated		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels		Channels Reserved		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
119	Charleston, S.C.	3	-	3	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
120	Florence, S.C.	1	2	1	-	-	1	-	-	-	1	-	1	-	1	-	-	-	-	-	-
121	Cadillac-Traverse City, Mich.	2	1	2	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
122	St. Joseph, Mo.	1	2	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
123	Tallahassee, Fla.-Thomasville, Ga.	1	2	1	-	-	1	-	1	-	-	1	-	1	-	-	-	-	-	-	-
124	Fargo, N.D.	2	1	2	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-
125	Austin, Tex.	1	3	1	1	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
126	Topeka, Kan.	1	3	1	1	-	-	-	-	-	2	1	-	1	-	-	-	-	-	-	-
127	Alexandria, La.	1	2	1	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
128	Wichita Falls, Tex.-Lawton, Okla.	3	2	3	-	-	-	-	-	-	2	-	2	-	-	-	-	-	-	-	2
129	Hannibal, Mo.-Quincy, Ill.	2	1	2	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
130	Tucson, Ariz.	3	2	3	-	-	-	-	-	-	2	1	1	1	-	-	-	-	-	-	1
131	LaCrosse-Eau Claire, Wis.	2	3	2	-	-	1	-	1	-	1	-	1	-	-	-	-	-	-	-	1
132	Wilmington, N.C.	2	1	2	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
133	Dothan, Ala.	1	2	1	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
134	El Paso, Tex.	3	2	3	-	-	-	-	-	-	2	1	1	-	-	-	-	-	-	1	1
135	Lexington, Ky.	-	3	-	2	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-	-
136	Chico-Redding, Cal.	2	1	2	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	1
137	Macon, Ga.	1	2	1	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	1
138	Columbia, Jefferson City, Mo.	2	2	2	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
139	Colorado Springs-Pueblo, Col.	3	3	3	-	-	-	-	-	-	3	1	-	-	-	-	-	1	-	-	-
140	Savannah, Ga.	2	1	2	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-
141	Lubbock, Tex.	2	2	2	1	-	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-
142	Santa Barbara, Cal.	2	1	2	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
143	Corpus Christi, Tex.	3	1	3	-	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	-
144	Bluefield, W. Va.	1	1	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
145	Biloxi, Miss.	1	1	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
146	Bakersfield, Cal.	-	3	-	3	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
147	Eugene, Ore.	2	1	2	-	-	-	-	-	-	1	-	1	-	-	-	-	-	1	-	-
148	Yakima, Wash.	-	3	-	2	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-
149	Bangor, Me.	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150	Huntsville-Decatur-Florence, Ala.	-	6	-	4	-	1	-	-	-	1	-	2	-	2	-	-	-	-	-	-
151	Odessa-Midland, Tex.	2	3	2	-	-	1	-	-	-	2	-	1	-	-	-	-	-	-	-	1
152	Wausau-Rhinelander, Wis.	3	1	3	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
153	Alexandria, Minn.	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
154	Abilene-Sweetwater, Tex.	2	2	2	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
155	Panama City, Fla.	2	1	1	-	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
156	Boise, Idaho	2	1	2	-	-	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-
157	Minot-Bismarck, N.D.	4	4	4	-	-	-	-	-	-	4	2	-	-	-	-	-	-	-	2	-
158	Tyler, Texas	1	1	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
159	Cheyenne, Wyo.	1	2	1	-	-	1	-	-	-	1	-	1	-	-	-	-	-	-	-	1
160	Meridian, Miss.	1	2	1	-	-	2	-	-	-	-	-	1	-	-	-	-	-	-	-	1
161	Mankato, Minn.	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1

Table G-1
TV Channel Allocation and Usage (cont'd.)

		COMMERCIAL										NONCOMMERCIAL									
ARB Rank	Market	Channels Allocated		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels		Channels Reserved		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
162	Ottumwa, Ia.-Kirksville, Mo.	1	1	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
163	Lower Rio Grande Valley (Harlingen-Weslaco, Texas)	2	1	2	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
164	Fort Smith, Ark.	1	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
165	Las Vegas, Nev.	3	1	3	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-
166	Akron, Ohio	-	2	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
167	Oak Hill, W.Va.	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
168	Greenwood, Miss.	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
169	Lake Charles, La.	1	1	1	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1
170	Columbus, Miss.	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
171	Hattiesburg-Laurel, Miss.	1	2	1	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
172	Lima, Ohio	1	2	-	1	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-	1
173	Ada, Okla.	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
174	Harrisonburg, Va.	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
175	Clarksburg-Fairmont, W.Va.	1	2	1	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
176	Reno, Nev.	3	2	3	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	1	-
177	Watertown-Carthage, N.Y.	1	1	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
178	Jackson, Tenn.	1	1	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
179	Billings, Mont.	2	2	2	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	1	-
180	Marquette, Mich.	2	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1
181	Roswell, N.M.	2	2	2	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
182	Redmore, Okla.	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
183	Rapid City, S.D.	2	2	2	-	-	-	-	-	-	2	1	-	1	-	-	-	-	-	-	-
184	Idaho Falls-Pocatello, Idaho	3	3	2	-	1	-	-	-	-	3	1	2	-	-	-	-	1	-	-	2
185	Bellingham, Wash.	1	2	1	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
186	Bowling Green, Ky.	1	1	1	-	-	-	-	-	-	1	-	1	-	-	-	1	-	-	-	-
187	Great Falls, Mont.	2	2	2	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	1	-
188	Casper, Wyo.	1	2	1	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	1	-
189	Medford, Oregon	3	-	2	-	-	-	1	-	-	-	-	1	-	-	-	-	-	1	-	-
190	Butte, Mont.	2	2	1	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	1	-
191	Eureka, Cal.	2	-	2	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-
192	Jonesboro, Ark.	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
193	Tupelo, Miss.	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
194	Salisbury, Md.	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
195	Hays, Kansas	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
196	Grand Junction-Montrose, Col.	2	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
197	Missoula, Mont.	2	2	1	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	1	-
198	Lafayette, Ind.	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
199	Fort Myers, Fla.	1	1	1	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
200	Ensign, Kan. (Dodge City)	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
201	Lufkin, Texas	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
202	Twin Falls, Idaho	2	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
203	Zanesville, Ohio	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table G-1
TV Channel Allocation and Usage (cont'd.)

ARB Rank	Market	COMMERCIAL										NONCOMMERCIAL									
		Channels Allocated		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels		Channels Reserved		Stns. on the Air		Auth.Stns. Not on the Air		Channels Applied For		Available Channels	
		V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
204	Muncie, Ind.	-	2	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
205	San Angelo, Tex.*	3	-	2	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	1
206	Yuma, Ariz.-El Centro, Cal.	4	-	2	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
207	Parkersburg, W.Va.	-	2	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
208	Presque Isle, Me.	1	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
209	North Platte, Neb.	1	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-
210	Klamath Falls, Oregon	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
211	Pembina, N.D.	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
212	Laredo, Tex.	2	1	1	-	1	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
213	Marion, Ind.	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
214	Riverton, Wyo.	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
215	Modesto, Cal.	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
216	Fort Pierce-Vero Beach, Fla.	-	1	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
217	Tuscaloosa, Ala.	-	2	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
218	Selma, Ala.	1	1	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
219	Helena, Mont.	2	-	1	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	1
220	Glendive, Mont.	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
221	Wildwood, N.J.	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
222	Canton, Ohio	-	2	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
223	Ashtabula, Ohio	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
224	Portsmouth, Ohio	-	2	-	1	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1
225	Anderson, S.C.	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
226	Worcester, Mass.	-	3	-	1	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	1
	Total Top 100 Markets	263	291	263	88	-	99	-	26	-	78	35	136	33	50	-	11	1	8	1	67
	Total Remainder (101-226)	198	177	180	38	6	23	3	7	9	109	33	97	16	6	1	2	3	5	13	84
	GRAND TOTAL	461	468	443	126	6	122	3	33	9	187	68	233	49	56	1	13	4	13	14	151

a/ Channels 13 and 31--Commercial channels used by ETV.
b/ Channel 12--Commercial channel used by ETV.
c/ Channel 23--Commercial channel used by ETV.
d/ Channel 17--Commercial channel used by ETV.
e/ WILX--Channel 10 shares time with WMSB-ETV station.
f/ Channel 25--Commercial channel used by ETV.

Source: Data on top 100 markets compiled by Federal Communications Commission.
Data on remaining markets compiled by Spindletop Research.

---

*Commercial and noncommercial both applying for Channel 6--Recorded only under commercial.

Appendix H

Television Viewing of Repeated Programs

Viewing data from the Hartford subscription television operation revealed a pattern of television viewing that has significance for noncommercial television programming. Two factors are involved when a person decides to watch a television program. First, he must want to do so. Second, it must be "convenient" for him to watch the program. He may want to watch a particular program, yet not be near a television set at the time the program is shown, or he may prefer some other activity available to him at the time the program is shown.

If "A" designates the number of people who want (at some time) to watch a particular program and if "p" designates the probability that it will be "convenient" for a viewer to watch the program at any given time, then the number of people viewing the initial showing of the program will be Ap.

The second time the program is shown, the potential audience for the program is smaller. Assuming that no viewers wish to see the program a second time, the total number of potential viewers is $A(1-p)$. The number of actual viewers for the second showing, therefore, is $A(1-p)p$. Similarly, the audience for the third showing is $A(1-p)^2p$.

The audience that can be expected to view repeated showings of a program strongly depends, therefore, on the value of p, the "convenience probability." If p is large, then the audiences for the second and third showings will be small. On the other hand, if the probability is small that a viewer will find it "convenient" to watch a program, then the audience for the program will be only slightly reduced with each successive showing. The audience for each repeat is less than the audience for the preceding showing by a factor of $1-p$; hence, if p is small, this reduction in audience size is small.

Data on viewing of movies on subscription television in Hartford was analyzed to estimate the value of p. This analysis indicates that the value of p is approximately 0.33. Only about one-third of the interested viewers find it "convenient" to watch the program at any given time. Table 19 shows the fraction of all interested viewers that watched repeated showings of the same program.

Table H-1 shows that if p is one-third, the combined audience for the second and third showings exceeds the audience for the original broadcast.

Table H-1
Fraction of Total Potential
Audience Watching
Repeated Programs

	p=1/3	p=1/4
First Showing	0.33	0.25
Second Showing	0.22	0.19
Third Showing	0.15	0.14
Fourth Showing	0.10	0.11

The implications of this analysis are important for educational television. If funds for educational programming are limited, perhaps repeated showings of programs should be deliberately planned in the educational television program schedule. By so doing, the total audience reached can be increased greatly with no increase in programming cost. Table H-1 is based on the assumption that no person watches a program twice--that when an individual watches a program, he is permanently removed from the possible audience for subsequent showings of the program. For educational television, this assumption is especially conservative, since a viewer is more likely to watch a repeated educational program than he is to watch a repeated commercial program. The effect of repeated viewings of the same program is the same as the effect of a lower p factor--the reduction in potential audience size with each showing is less. For educational programs, therefore, even greater audiences might be expected for the second and third showings. Table H-1 indicates for example, that with p = 1/4, the combined audiences for the second and third showings is about one-third larger than the original audience.